CALIFORNIA
High-Speed Rail Authority

Managing the Nation's Largest Infrastructure Project

Project Update Report to the California State Legislature

March 1, 2017

www.hsr.ca.gov

CALIFORNIA
High-Speed Rail Authority

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The California High-Speed Rail Authority (Authority) is responsible for planning, designing, building and operating the first high-speed rail system in the nation. California's high-speed rail system will connect the mega-regions of the state, contribute to economic development and a cleaner environment, create jobs and preserve agricultural and protected lands. By 2029, the system will run from San Francisco to the Los Angeles Basin in under three hours and will be capable of speeds of over 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations. In addition, the Authority is working with state and regional partners to implement a statewide rail modernization program that will invest billions of dollars in urban, commuter, and intercity rail systems to meet the state's 21st century transportation needs.

Statutory Requirements for the Project Update Report

In July 2012, the California Legislature approved – and Governor Brown signed into law – Senate Bill (SB) 1029 (Budget Act of 2012) which appropriated almost $8 billion in federal and state funds to construct the first high-speed rail segments in the Central Valley and fund 15 bookend and connectivity projects throughout California. The bill also put into place reporting requirements to ensure project legislative oversight. The requirement for a project update report was updated in June 2015 (AB 95). The requirements for the submission of a biennial Project Update Report are as follows:

On or before March 1, 2017 and every two years thereafter, the Authority shall provide a project update report, approved by the Secretary of Transportation and consistent with the criteria in this section, to the budget committees and the appropriate policy committees of both houses of the Legislature, on the development and implementation of intercity high-speed train service pursuant to Section 185030. The report, at a minimum, shall include a program wide summary, as well as details by project section, with all information necessary to clearly describe the status of the project, including, but not limited to, all of the following:

(a) A summary describing the overall progress of the project.

(b) The baseline budget for all project phase costs, by segment or contract, beginning with the California High-Speed Rail Program Revised 2012 Business Plan.

(c) The current and projected budget, by segment or contract, for all project phase costs.

(d) Expenditures to date, by segment or contract, for all project phase costs.

(e) A comparison of the current and projected work schedule and the baseline schedule contained in the California High-Speed Rail Program Revised 2012 Business Plan.

(f) A summary of milestones achieved during the prior two–year period and milestones expected to be reached in the coming two–year period.

(g) Any issues identified during the prior two–year period and actions taken to address those issues.

(h) A thorough discussion of risks to the project and steps taken to mitigate those risks.

Project update reports are required to be prepared biennially in odd-numbered years. The Authority is also required to prepare and submit business plans to the Legislature, also on a biennial basis, in even-numbered years. Together these fulfill the requirements of Government Code 16724.4 which relates to annual reporting requirements associated with voter approved bond measures.

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Executive Summary

The California high-speed rail program represents the largest, most complex and, in many ways, most far-reaching public infrastructure project in the nation. As a mega project, it faces a myriad of regulatory, environmental, public policy, political, funding and other challenges that must be anticipated and effectively managed in order for the program to be successfully delivered. This is an ambitious but worthy undertaking. As the backbone of an integrated, modern, statewide rail network, it will fundamentally transform how people move around our state and will serve as a catalyst to California's future development, growth and prosperity.

This 2017 Project Update Report provides a comprehensive review of the substantial progress we have made on multiple fronts in delivering this momentous project since our last report in March 2015 shortly after the program's official groundbreaking. In the Central Valley, we now have over 119 miles of construction activity underway which includes land being cleared, bridges and other structures going up and people and businesses being put to work. In other project sections, environmental reviews, preliminary design and public outreach are advancing, and progress is being made on a range of regional passenger rail projects that will provide direct connectivity to the future high-speed rail system.

The Authority is continuing its transition from a very small planning agency to a project delivery organization with an equal focus on project development and project implementation and delivery. Our organizational and technical capacity has grown to meet the challenge of fulfilling our mission. And reflecting the magnitude and complexity of the program, there is a more pronounced focus on identifying, managing and mitigating potential risks, as well as continually improving our systems, processes and practices in order to effectively manage scope, schedule and budget pressures. Equally important, as a public project, we have instituted stringent oversight and reporting processes to provide a high degree of transparency and accountability to the citizens of California. This Project Update Report describes these and other developments associated with bringing the nation's first high-speed rail system to the State of California.

The 2016 Business Plan

The 2016 Business Plan, which was adopted by the Board of Directors in April 2016, established three fundamental objectives for implementing the program.

- **First, initiate high-speed passenger rail service as soon as possible.**

  The 2016 Business Plan set forth a plan, based on current funding sources, to initiate passenger service on the Silicon Valley to Central Valley Line by 2025. Work is underway on a range of fronts from – design, station planning, environmental planning to procurement plans and the actual construction that is underway. The 2016 Business Plan also committed to exploring ways to extend initial service to San Francisco, Bakersfield and Merced. It presented a new, lower capital cost estimate for the Phase 1 system. The overall estimate—for the same scope

as the 2014 Business Plan—was reduced by 8 percent to $62.1 billion; at the same time, new scope was added to fulfill the commitment of one-seat ride service to Anaheim, bringing the revised cost estimate to $64.2 billion, still lower than the prior 2014 estimate of $67.6 billion (YOE$).

- **Second, make strategic, concurrent investments throughout the system that will be linked together over time.** The 2016 Business Plan underscored our intent to make concurrent investments in parts of the system, such as in the Burbank to Anaheim and San Francisco to San Jose corridors, to deliver early benefits and lay the foundation for high-speed rail service on the Phase 1 system between San Francisco and Los Angeles/Anaheim by 2029.

- **Third, position ourselves to construct additional segments as funding becomes available.** The Business Plan established a very important goal—to environmentally clear the entire Phase 1 system in order to be shovel ready as funding becomes available. Our ability to expedite environmental reviews depends on many factors that are under the control of other agencies. We work with multiple partners, such as the Federal Railroad Administration, the U.S. Army Corps of Engineers and others, who are required to comply with or address their own statutory mandates and/or may face resource constraints. To proactively mitigate those constraints wherever possible we consistently collaborate with our partners in the environmental process.

Construction in the Central Valley

Four construction contracts have been awarded and executed in the Central Valley. Construction of high-speed rail spans 119 miles including:

- 9 active project sites
- More than 900 construction workers
- 174 small businesses
- 50 grade separations
- $500 million for local improvements

PROGRESS ON MULTIPLE FRONTS

High-Speed Rail is Happening

Two years have passed since the Authority officially broke ground on construction in the Central Valley in 2015, and now 119 miles of construction activities are underway. Three design-build construction teams are working between Madera and Kern Counties on contracts valued at $3.24 billion. In addition, Caltrans is managing the realignment of a portion of State Route 99 in Fresno to make room for high-speed rail. Bridges, viaducts and grade separations are visible at multiple locations and the first complete structures are expected to be completed this year. Workers and residents of the Central Valley are already seeing the benefits of this monumental rail project as the project's economic benefits continue to bolster the recovery.

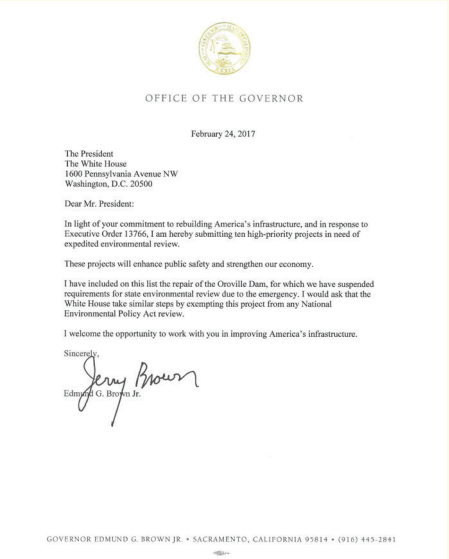
Becoming Shovel Ready

The 2016 Business Plan established a very important goal – to make the Phase 1 system between San Francisco/Merced and Los Angeles/Anaheim shovel ready as quickly as possible. To achieve that objective, the Authority established a timeline to environmentally clear all project sections by the end of 2017. The Authority remains committed to completing environmental reviews expeditiously in order to provide clarity to local communities, stakeholders and

regional partners as to the route and station locations, and to be shovel ready in order to build out the system and facilitate intermediate improvements as funding is available.

As a result of continued coordination among agency partners, we have updated our environmental review schedules and are targeting to identify all preferred alternatives and issuing draft environmental documents by the end 2017 for the remaining Phase 1 project sections. This schedule is still undergoing development with the Federal Railroad Administration. These updated environmental schedules will not affect in any significant way our ability to deliver the Silicon Valley to Central Valley Line as outlined in the 2016 Business Plan.

In support of this effort, on February 24, 2017, Governor Brown, in response to the Trump Administration's recent Executive Order 13766, sent to the President and the Acting Chair of the Council on Environmental Quality a letter requesting the expedited federal environmental review of 10 of California's highest-priority infrastructure projects. High-speed rail was included on this list. The President's Executive Order, which allows for the expediting of environmental review and approval for high-priority infrastructure projects, is intended to cut through federal red tape and would help position the high-speed rail program to be ready to utilize future funding, to deliver the program and to continue creating thousands of jobs in communities throughout the state.



OFFICE OF THE GOVERNOR

February 24, 2017

The President
The White House
1600 Pennsylvania Avenue NW
Washington, D.C. 20500

Dear Mr. President:

In light of your commitment to rebuilding America's infrastructure, and in response to Executive Order 13766, I am hereby submitting ten high-priority projects in need of expedited environmental review.

These projects will enhance public safety and strengthen our economy.

I have included on this list the repair of the Oroville Dam, for which we have suspended requirements for state environmental review due to the emergency. I would ask that the White House take similar steps by exempting this project from any National Environmental Policy Act review.

I welcome the opportunity to work with you in improving America's infrastructure.

Sincerely,

Jerry Brown

Edmund G. Brown Jr.

GOVERNOR EDMUND G. BROWN JR. • SACRAMENTO, CALIFORNIA 95814 • (916) 445-2841

On February 24, 2017 Governor Brown requests expedited environmental review of high-speed rail by the Trump Administration.

Making Strategic, Concurrent Investments Across the State

The Authority is working with state and regional partners to advance and accelerate regionally significant concurrent investments that will provide early improvements to regional rail systems and serve as building blocks for high-speed rail. Senate Bill 1029 appropriated $1.1 billion of Proposition 1A funds for blended system improvements in the bookends of the Phase 1 system.

Through the 2012 Southern California Memorandum of Understanding, the Authority committed $500 million to boost projects in the region. This money will support over $1 billion in bookend projects including projects in the Burbank to Los Angeles and Los Angeles to Anaheim corridors. A number of priority regional projects have been identified and are in various stages of planning and development. Examples of bookend projects currently being advanced include:

- **Los Angeles Union Station (Link US) –** A project designed to increase rail capacity at Los Angeles Union Station by 40 to 50 percent, improve access and connectivity, improve air quality and modernize the passenger concourse area – to date the Authority has committed funding for project development costs.

- **Rosecrans/Marquardt Grade Separation Project –** This project will implement the California Public Utilities Commission's highest priority grade separation project which will increase safety, improve the movement of freight, allow an additional 32 passenger rail trains per day to operate through the corridor including to East Los Angeles and the Inland Empire and reduce emissions from idling vehicles. A funding plan is being developed for this project.

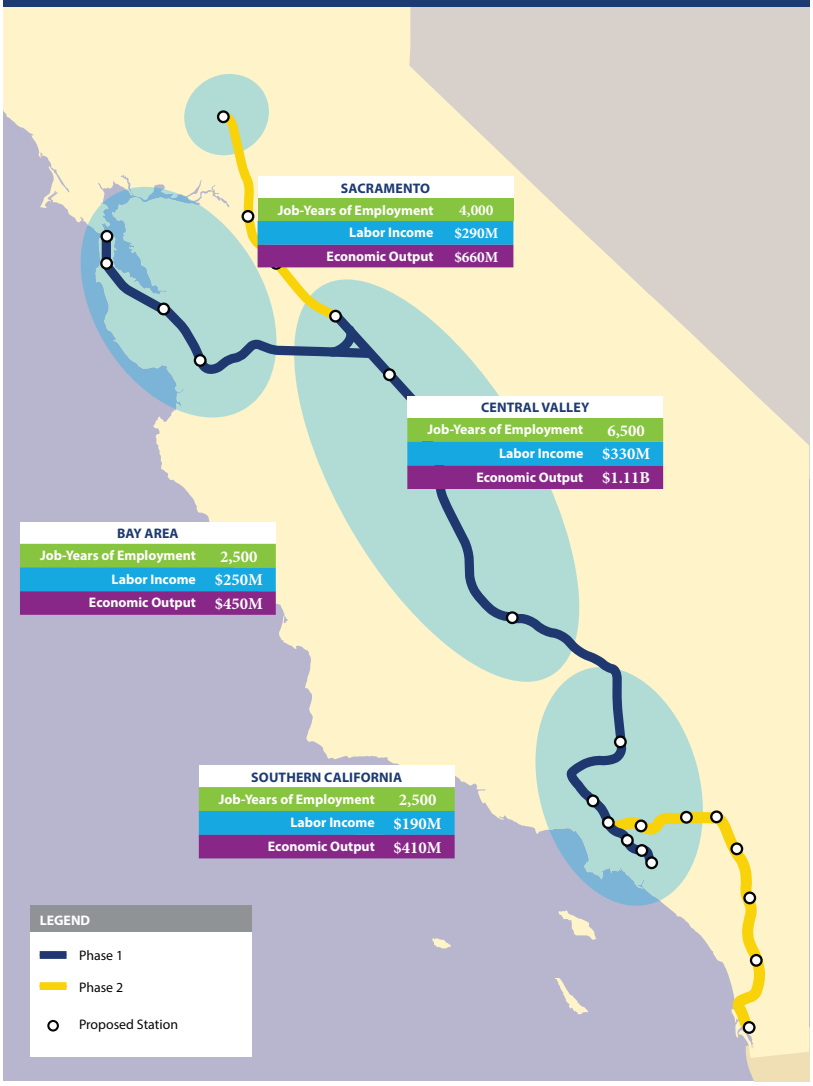
The Authority is also a funding partner for the Peninsula Corridor Electrification Project (PCEP), which will increase capacity and improve safety in the Caltrain commuter rail corridor between San Francisco and the Silicon Valley. The Authority's contribution is intended to advance key project elements which will initially improve service between Tamien Station in San Jose and the Caltrain terminal at 4th and King in San Francisco, and in the future, allow high-speed rail to use the corridor as part of blended operations with Caltrain. This critically important regional project is ready to move forward. However, the Trump Administration recently deferred a final decision on a grant that is also key to funding this project and federal action is still pending as this report is being released. Governor Edmund G. Brown Jr. has sent a letter to United States Department of Transportation Secretary Elaine Chao urging her to approve the Caltrain grant, and the Authority will continue to work with Caltrain to advance this critical project.

ECONOMIC IMPACT OF CALIFORNIA HIGH-SPEED RAIL

Creating Jobs and Stimulating California's Economy

From July 2006 through June 2016, the Authority has invested more than $2.3 billion in planning and constructing the nation's first high-speed rail system. More than 630 different private sector firms have worked for the program during this period. These contractors have hired workers throughout the state and have, in turn, paid suppliers for goods and services -- further stimulating industries in each of the state's economic megaregions. Together these direct and indirect jobs have induced wider economic activity by pumping money back into California's local economies with dollars spent in places such as local coffee shops, restaurants or grocery stores.

ES.1 ECONOMIC IMPACTS BY REGION (INCLUDING DIRECT, INDIRECT, AND INDUCED) JULY 2006 – JUNE 2016



Overall this investment has resulted in 19,900 to 23,600 job-years of employment, and generated $3.5 to $4.1 billion in total economic activity. Our spending forecast of approximately $1 billion during FY 2016-2017 will support approximately 12,000 additional job-years.

Of the $2.3 billion invested through mid-2016:

- 52 percent of the spending occurred in disadvantaged communities.
- 94 percent of the spending went to companies and people within California.
- 70 percent was funded by the American Recovery and Reinvestment Act (ARRA), infusing the state's economy with federal dollars.

The Central Valley has experienced the most substantial economic impacts as construction has started and ramped up over the past few years. The impact of the high-speed rail investment between July 2015 and June 2016 is equivalent to about 11 percent of the 32,000 jobs that were created in the Central Valley economy over the same period. Table ES.1 shows the distribution of economic impacts across the state by region.

Creating Opportunities for Small and Disadvantaged Businesses

Hundreds of California small businesses, disadvantaged businesses and disabled veteran businesses are hard at work planning, designing and construction the high-speed rail system. Since implementing small business goals in August 2012, the Authority's Small and Disadvantaged Business Enterprise Program has paid more than $244 million to certified Small, Disadvantaged and Disabled Veteran Business Enterprises in California for their work on the program through October 2016. For the same period, professional services contractors have collectively met the 30 percent small business utilization target, while design-build contractors are working to attain their utilization target as construction activities ramp up.

As of October 2016 small business participation includes:

- 334 Small Businesses
- 102 Certified Disadvantaged Business Enterprises and
- 39 Certified Disabled Veteran Business Enterprises

MANAGING SCOPE, SCHEDULE AND BUDGET THROUGH A COMPREHENSIVE, STATE-OF-THE-ART RISK MANAGEMENT PROGRAM

The management of risk is one of the Authority's key responsibilities as we work to deliver the program. It is also an area that is often misunderstood. To help the Legislature and public gain a better understanding of the steps we are taking to proactively manage the program's risks, we have focused extensively on these items below and throughout this Project Update Report.

Like other large, complex infrastructure projects, we face a range of budget, schedule and other risk pressures every single day. We manage those risks through a robust and transparent risk management program, a thorough change control process, and by establishing and managing appropriate contingencies – with $11 billion in contingency, out of a total cost of $64 billion for the Phase 1 program, set aside for risk.

Risk Management Program: We use a highly sophisticated risk management program to continually identify, evaluate, assess, document, mitigate and manage all potential risks to scope, schedule and budget. Our Risk Management team has a direct reporting relationship with the Board of Directors, and provides regular updates on identified risks, what risks have occurred versus those that have been alleviated, and what actions are necessary. The risk team is supported by a robust Program Controls division that is constantly assessing current project progress, project changes, cost impacts and expenditures. Taken together, these independent programs are constantly taking the pulse of the project and report monthly to the Board on program elements, including environmental progress, right of way acquisition, third party negotiations, construction progress and budget versus actual expenditures. These actions

provide specific accounting and visibility on the program and support the Board of Directors in making informed decisions. More information on current program risks can be found in the Risk Management Section.

Change management: As we proceed through both the project development and construction phases, we employ a well-established process for monitoring and managing change.

- A Change Control Committee is responsible for reviewing proposed project-level (change orders) and program-level (configuration) changes. Once a full evaluation of the facts and effect to the program are understood, the Committee provides feedback, concurrence or recommendations for actions to be taken. Recommendations are then forwarded for decision making by the Board of Directors, Chief Executive Officer, or the Authority-delegated managers as defined in the Delegated Authority.

- The executed change orders through December 2016 total $97 million from the Board approved contingency of $483 million. Other changes to the construction contracts have been executed that added scope that was not originally included in those contracts but was part of the overall program (for example the Madera extension on Construction Package 1).

Contingency: We use a risk-based approach to establishing appropriate contingency as part of our capital cost estimating process. During the project development stage:

- Contingency levels are initially set higher and decrease as more detailed information on potential risk is available by completing additional engineering and design.

- Contingency is divided into two major categories – unallocated contingency (program wide) and allocated contingency (allowances allocated against specific cost categories).

- In setting allocated contingencies during the preliminary design stage, the percentage selected for each cost category is generally based on:

  - Level of complexity of the cost category and scope of work involved, (e.g., complex tunnels versus more straightforward at-grade construction)

  - Historical cost variability typically seen within that cost category.

  - Professional judgment and experience relative to the level of uncertainty

The allocated contingencies established for the cost categories for each project section still in preliminary engineering, range from 10 percent to 25 percent.

- Unallocated contingencies have been estimated at five percent of the total construction costs excluding right of way, high-speed trains and professional services for the sections that are still in preliminary engineering.

- For the full Phase 1 system, almost $11 billion in contingency has been built into the $64.2 billion estimate; as we proceed, we continually monitor and assess pressures and trends that could affect costs.

How The Authority Manages Scope, Schedule & Budget Pressures Through Risk Management

Since the inception of this program, a range of issues, pressures and decisions have been addressed that affect its delivery. Some pressures, like litigation and right-of-way acquisition, can delay the program and drive costs up while others, such as alternative design concepts, create opportunities to drive costs down. We use a robust risk management program to:

- Identify potential risks
- Assess the probability of their occurring
- Quantify the magnitude of their potential impact
- Develop measures to avoid, minimize, mitigate or manage those risks

Through this program, we manage the many pressures encountered in delivering the high-speed rail system, which are discussed on a monthly basis with the Board of Directors' Finance and Audit Committee. As we proceed through project development, our understanding of the potential risks increase and contingency levels are established based at appropriate levels to account for those risks. At the construction phase, each design-build contract includes its own contingency established through a risk-based approach where a detailed assessment of the actual potential risks, specific to the work to be performed, is conducted and a contingency is allocated to the contract budget. The Phase 1 capital cost estimate includes $11 billion in contingency out of a total cost of $64.2 billion (YOE$). As the program advances, risks are monitored and managed with the goal of avoiding them or reducing their impact.

Here are examples of how we have met and addressed risk:

- **Risk management and contingency used to manage delays on Construction Package 1.**
  In 2013, $160 million in contingency was allocated for this design-build contract. One potential risk was the possibility of delay in the delivery of right of way to the contractor. A delay did indeed occur and change orders in the amount of $63.5 million were executed for those delay-related impacts. This risk had been anticipated, contingency had been established for it and the change management process was used to effectively manage it.
- **Managing utility relocation costs and schedule for Construction Package 1.**
  Originally this contract excluded work and costs for relocating utilities owned and/or operated by PG&E and AT&T because not enough information was available to accurately develop a scope and cost estimate. Contracts were executed directly with the two utility companies to perform the work. Subsequently, recognizing the need to keep pace with construction, we executed a change order to transfer the work to the design-build contractor and the budget for this work was included in the updated 2016 Business Plan cost estimate. This illustrates the dynamic nature of managing a complex project in a changing environment.
- **Alternative design proposals yielded cost savings for Construction Package 2-3.**
  In January 2015, a contract for $1.365 billion was awarded to design-builder Dragados/Flatiron/Shimmick; significantly less than our $1.5 to $2.0 billion estimate. As part of its proposal, the team suggested alternative technical concepts including, for example, building a portion of the alignment at-grade to reduce visual impacts, which shorten the construction schedule and included an estimated $115 million in cost savings.
- **Early purchase of radio spectrum rights to avoid future obstacles and costs.**
  Last year the Authority acquired rights for radio spectrum to establish a secure communication system for train operations. Knowing that this could require a lengthy search with many obstacles – intense competition, lack of willing sellers and prohibitive costs in some radio bands – we began an early search for spectrum for the Phase 1 system. In April 2016, we successfully acquired spectrum rights for both Phase 1 and Phase 2 for $53.8 million, under the $55 million budget established for Phase 1.
- **Central Valley Wye preferred alternative is $221 million less than assumed in 2016 Business Plan.**
  Since 2012, a wide range of alternative alignments have been reviewed with the goal of striking the best balance among project objectives, environmental impacts and community concerns. In January 2017, the preferred alternative for the Central Valley Wye was identified and is estimated to cost $221 million less than the alternative assumed in the 2016 Business Plan.

These examples show that managing scope, schedule and budget is a dynamic and continuous process, not a one-time or occasional exercise. It is managed through proven project management practices and a continuous focus on risk and monitoring trends that could either drive costs up or provide opportunities to drive them down.

When preparing to procure each contract for construction, an engineers' estimate is developed. For design-build contracts, the Authority employs a state-of-the-art, risk-based approach for setting contract contingency that is reviewed by the Board of Directors prior to being allocated to the contract budget. More specifically:

- We conduct a detailed analysis to identify what the specific risks might be, quantify them and develop an estimated contingency based on that analysis. That is, we don't apply a rule of thumb percentage, but establish an amount based on a detailed assessment of the actual potential risks specific to the work to be performed under the contract and the contract terms.

- As we proceed, knowing what the potential risks are, we actively monitor and manage them, working to avoid the risks altogether or reduce their impacts – reducing the need to tap into the contingencies to cover actual risk occurrences.

- Analysis of the Construction Package 1 project indicates that there are cost and schedule pressures due to right-of-way acquisition, utility relocations, railroad and other third-party issues. These risks were identified in the 2016 Business Plan and in prior Project Update Reports, as well as in regular updates to the Board of Directors' Finance and Audit Committee, and partially accounted for in the approved Construction Package 1 contingency. It is expected that there will be a net increase in final cost to complete for Construction Package 1. Specific response and mitigation actions for these risks are addressed in detail in the Risk Management Section of this report. These risks and trends are, mitigated by cost savings associated with other elements of the program, such as the preferred alternative that was recently identified for the Central Valley Wye which is currently $221 million less than the alternative assumed in the 2016 Business Plan estimate. Other savings may accrue from ongoing cost control, risk mitigation and value engineering.

The Authority has established a substantial contingency as part of the Central Valley Segment Funding plan. This contingency is $923 million of a total cost of $7.8 billion. The cost estimates in the Central Valley Segment Funding Plan were reviewed by the independent consultant whose ***report*** accompanied the funding plan. In the review they state, "We consider the cost estimates for the Central Valley segment, including the allowances for contingency, to be adequate (although some individual line items appear to be high or low from our standpoint, offsetting each other)…."

Oversight, transparency and accountability: A key aspect of effectively managing risk is ensuring that a detailed understanding of every aspect of the program is monitored, reported and managed. As the program has evolved and its complexity has increased, our reporting has become equally detailed and rigorous.

In September 2015, the Authority inaugurated a monthly Operations Report to the Finance and Audit Committee that addresses every aspect of project development and delivery.

- Currently, 19 financial and performance reports are generated every month providing detailed metrics which are rigorously scrutinized by the Committee.

- → The Risk section of the Operations Report is updated, monitored and tracked in real time to allow for early identification and mitigation of all potential issues.

These reports are provided to the full Board, shared with the Legislature and posted on the website. All Committee and Board of Directors meetings are open to the public, and the Board meetings are streamed live online.

The California Peer Review Group – which reports to the Legislature reviews the planning, engineering, financing, and other elements of the Authority's plans and provides its view on the appropriateness and accuracy of the Authority's assumptions. Also, working with the Authority, the Peer Review Group developed a set of broad "dashboard" indicators meant to give the Legislature an overall perspective from period to period of how the project is progressing and of where problems might be arising. The Authority updates these dashboard indicators biannually and makes them available to the public and Legislature.

Anticipating and managing risks to delivering the Silicon Valley to Central Valley Line: Based on lessons from the first construction segment, steps are already underway to identify, manage and mitigate potential risks to delivering the Silicon Valley to Central Valley Line for revenue service in 2025.

- → Additional right-of-way services are being procured to prepare for the approximately 1,800 parcels that will need to be surveyed, mapped and acquired for construction of the Silicon Valley to Central Valley Line.

- → Procurement documents for the remaining major procurements, including the high-speed trains, track and systems, and design-build civil construction packages for the sections to be constructed between Madera and San Jose are being drafted with the intent of being able to quickly move into construction once environmental clearance (Notice of Determination/ Record of Decision) is complete.

- → Identification of a preferred alignment for the Central Valley Wye near Chowchilla which, if adopted, should enhance public acceptance, reduce risk, and which is currently $221 million less than the alternative assumed in the 2016 Business Plan estimate.

- → Procurement of an Early Train Operator is also underway. Once on board the Early Train Operator, will provide advice on our other major procurements.

OUR PROGRESS IS IMPORTANT NOW MORE THAN EVER

This 2017 Project Update Report further details the important work we have accomplished and outlines the challenges that we face and how we manage them. When the California high-speed rail system is complete, it will connect and transform the state and will contribute to the state's future economic growth.

California is the largest state in the nation with one out of every eight Americans living here. If we were a country, we would be the sixth largest economy in the world. We are the epicenter of innovation, exploration and bold experimentation. Our standing as a national and global leader and economic

powerhouse has been shaped by those attributes and by investments in our university systems, our economy and our infrastructure.

Today, however, our state's transportation infrastructure is straining to keep up with growing demand and more investment is necessary. Too many people waste hours of productive time stuck in traffic or waiting for delayed flights. And too many people lack adequate access to well-paying jobs, educational opportunities and affordable housing. As the largest infrastructure project in the nation, California high-speed rail will be the backbone of a modern, integrated statewide passenger rail network which will dramatically improve access and connectivity and provide the transportation capacity we need to keep our state moving and prospering. It will link together the Bay Area, Los Angeles Basin and Central Valley economic regions, and once that is accomplished, the benefits will multiply for decades to come. Once it is complete, it will be hard to think of California without it.

CALIFORNIA HIGH-SPEED RAIL STATEWIDE SYSTEM

1. Statewide Update

2016 BUSINESS PLAN SETS STAGE FOR INITIAL PASSENGER RAIL SERVICE

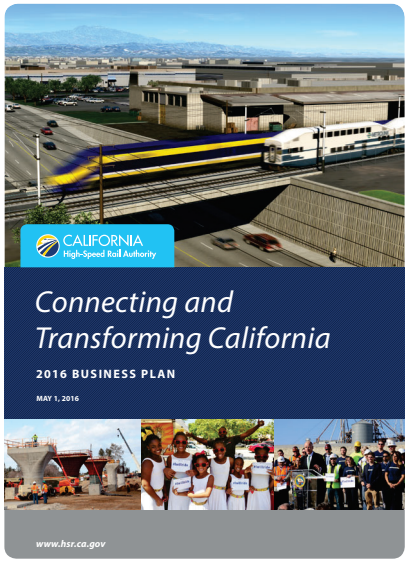
On April 28, 2016, the Board of Directors adopted the 2016 Business Plan, which laid out an approach to sequencing the Phase 1 system that will ultimately connect San Francisco/Merced to Los Angeles/Anaheim via the Central Valley with high-speed rail passenger service. First, the 2016 Business Plan set forth a plan to initiate passenger service between the Silicon Valley and the Central Valley by 2025. Because of the Legislature's commitment of ongoing Cap and Trade proceeds, we were able, for the first time, to identify the necessary funding from existing sources to achieve the goals of Proposition 1A. The 2016 Business Plan also committed to exploring ways to extend initial service to San Francisco, Bakersfield and Merced. Second, the implementation strategy laid out in the 2016 Business Plan focused on making strategic, concurrent investments throughout the system that will be linked together over time, particularly in the important passenger rail corridor between Burbank, Los Angeles and Anaheim. Third, it emphasized positioning the program to be shovel ready to move quickly into construction as funding becomes available by working to secure environmental approvals for every mile of the Phase 1 system as soon as possible.

SB 1029 PROJECT UPDATE REPORT

Section (a)

A summary describing the overall progress of the project.

The 2016 Business Plan showed that the overall Phase 1 capital costs were reduced based on a number of factors, including lessons learned from the initial construction contracts, more advanced design work and value engineering. It showed that once the Silicon Valley to Central Valley Line is up and running and revenues are demonstrated, it is projected to have material value to a potential private sector investor as a stand-alone service. The overall capital cost estimate—for the same scope as the 2014 Business Plan—was reduced by 8 percent to $62.1 billion; at the same time, new scope was added to fulfill the commitment of a one-seat ride to Anaheim, bringing the revised cost estimate to $64.2 billion, still lower than the prior 2014 estimate of $67.6 billion (YOE$). The 2016 Business Plan described the progress made since the 2014 Business Plan, updated available funding/financing and ridership/revenue forecasts and updated the risk management discussion. The public review process spanned 60 days, three legislative hearings and included more than 300 public comments. The plan was adopted by the Board of Directors in April and delivered to the Legislature on May 2, 2016. To read the 2016 Business Plan, visit ***www.hsr.ca.gov/About/Business_Plans/2016_Business_Plan.html***



FUNDING PLANS SUBMITTED FOR CENTRAL VALLEY AND SAN FRANCISCO TO SAN JOSE PENINSULA CORRIDOR

At its December 13, 2016 meeting, the Board of Directors approved two funding plans—the San Francisco to San Jose Peninsula Corridor Segment Funding Plan and the Central Valley Segment Funding Plan—both of which will help fund the advancement of the Silicon Valley to Central Valley Line for passenger service in 2025. These funding plans are necessary steps under Proposition 1A before bond

proceeds can be used for construction in the Central Valley and for development and construction related to the Peninsula Corridor Electrification Project. As part of this action, the Board of Directors also designated these as "usable segments" consistent with Proposition 1A (as codified in California Streets & Highways Code). The Central Valley Segment Funding Plan would allow access to the $2.61 billion in Proposition 1A funds that were appropriated in Senate Bill (SB) 1029, the Budget Act of 2012, for the 119-mile segment in the Central Valley that is currently under construction.

The San Francisco to San Jose Peninsula Corridor Funding Plan would allow access to the $600 million in Proposition 1A bond funds appropriated in SB 1029 for Caltrain's Peninsula Corridor Electrification Project, which represents 30 percent of the total funding for the $1.98 billion project. However, the Trump Administration recently deferred a final decision on a grant that is also key to funding this project and federal action is still pending as this report is being released. Governor Edmund G. Brown Jr. has sent a letter to United States Department of Transportation Secretary Elaine Chao urging her to approve the Caltrain grant, and the Authority will continue to work with Caltrain to advance this critical project. Improvements to this corridor are a part of the Authority's blended service plan consistent with the 2016 Business Plan, and with direction in SB 1029 that a blended system be developed between San Francisco and San Jose.

Consistent with statutory requirements, the funding plans were submitted to the Director of Finance and the Chair of the Joint Legislative Budget Committee, along with the required Independent Consultant Reports on January 3, 2017. Under Proposition 1A, the Director of Finance is required to review each plan within 60 days. After reviewing the plans, and receiving any communication from the Joint Legislative Budget Committee, if the Director finds the plans are is likely to be successfully implemented as proposed, the Authority may enter into commitments to expend the bond funds as described in the funding plans.[1]

HIGH-SPEED RAIL CONSTRUCTION
Putting America to Work
THIS PROJECT FUNDED BY:
HIGH-SPEED PASSENGER TRAIN BOND PROGRAM
AMERICAN RECOVERY AND REINVESTMENT ACT
GREENHOUSE GAS REDUCTION FUND
BE WORK ZONE ALERT

ARRA funding was intended to stimulate the economy, create jobs, spur technological development, and build new transportation infrastructure, such as California high-speed rail program, that will provide long-term economic benefits.

FULFILLING AMERICAN RECOVERY AND REINVESTMENT ACT GRANT REQUIREMENTS

Of the $3.48 billion in federal funds that the Authority has secured to advance the program, $2.55 billion came from the American Recovery and Reinvestment Act (ARRA), which was enacted in 2009. This funding was intended to stimulate the economy, create jobs, spur technological development, and build new transportation infrastructure that provides long-term economic benefits. The ARRA funds for high-speed rail, matched with state funds, were directed toward construction in the Central Valley, as well as continuing to advance engineering and environmental reviews along the entire Phase 1 system extending from San Francisco and Merced in the north, to Los Angeles and Anaheim in the south. The decision to start construction in the Central Valley was made to lay

the groundwork for establishing a section where the high-speed rail trains can be tested and commissioned before being put into revenue service.

A key provision of the federal statute is that all funds provided through ARRA must be fully expended by September 30, 2017. By working collaboratively with the Federal Railroad Administration through its ARRA grant agreement, this objective is being met and the benefits associated with these economic stimulus funds are putting Californians to work as described above. As of February 21, 2017, $2.29 billion or 89.7 percent of the $2.55 billion had been invoiced and submitted for reimbursement to the Federal Railroad Administration. Since the expenditure rate has now reached about $100 million per month, the full $2.55 billion is expected to be fully expended before the deadline.

EARLY PROPOSITION 1A INVESTMENTS AND STATEWIDE RAIL MODERNIZATION

In 2012, SB 1029 appropriated $2 billion in Proposition 1A funds that will leverage approximately $5 billion in additional funding for bookend and connectivity projects. The Authority has endeavored to achieve early approval and release of Proposition 1A dollars for construction of a number of regionally significant connectivity projects, most notably in the heavily congested urban rail corridors in Northern and Southern California.

The largest investment has been in the blended operation bookends of the Phase 1 system totaling $1.1 billion. This funding is the subject of two Memoranda of Understanding (MOU) with agency partners in Northern and Southern California. In 2016, the Authority agreed to a supplement to the MOU with Northern California agencies to increase funding for the Peninsula Corridor Electrification Project to a total of $713 million. The MOU was updated to reflect the increased costs that resulted after bids were received. Additional funding was provided by multiple stakeholders, which is contained in the MOU supplement. All partners continue to work together to identify additional sources of funds for this important and foundational project.

In Southern California, the Authority continues to work with partner agencies to advance early investments associated with the Southern California MOU. These include the Doran Street Grade Separation and the Link Union Station (Link US) Project, the State College Grade Separation and the Fullerton Junction. The Rosecrans-Marquardt Grade Separation project has been identified as the first project to be funded using funds set aside for Southern California as a part of SB 1029. The Authority is working closely with its Southern California transportation partners to prepare the detailed funding plan required under Proposition 1A.

SB 1029 also appropriated $819 million in Proposition 1A dollars for 17 regionally significant connectivity projects that will provide direct connectivity and support high-speed rail lines and facilities. More than 50 percent of these dollars have been expended. The California Transportation Commission manages and oversees the disbursement of funds. More information is available at:
www.hsr.ca.gov/Programs/Statewide_Rail_Modernization/index.html

CONSTRUCTION PROGRESS

In January 2015, the Authority and its partners celebrated the official groundbreaking for the high-speed rail system in Fresno. Today, construction is well underway with 119 miles of construction

build
HSR
CALIFORNIA
www.buildHSR.com

ongoing from Madera to north of Bakersfield. Three design-build teams are working on three separate sections of high-speed rail stretching through the Central Valley. Meanwhile, the California Department of Transportation (Caltrans) is completing the State Route 99 Realignment in Fresno, which will move the highway about 100 feet to the west to make room for the high-speed rail line. Work began first on the most complex structures: bridges, viaducts and overcrossings. Clearing and demolition along the right of way and drilling for geotechnical investigations and utility locating can also be seen throughout the Central Valley.

Other work that supports future high-speed rail service is also underway. Besides the projects discussed above, and in the Milestone Section of this Project Update Report, the Transbay Transit Center is also under construction in downtown San Francisco and is set to open later this year. This urban transit hub, managed by the Transbay Joint Powers Authority (TJPA), will connect to 11 transportation systems, including the high-speed rail system.

High-speed rail construction is generating a lot of interest. Over the last two years, dozens of stakeholders – elected officials, federal officials, reporters and business leaders – have toured the construction sites. To find out more about construction progress on high-speed rail, visit ***www.buildhsr.com***

ECONOMIC BENEFITS OF CALIFORNIA HIGH-SPEED RAIL

From July 2006 through June 2016, the Authority has invested more than $2.3 billion in planning and constructing the nation's first high-speed rail system. This investment has created jobs and generated economic activity. Throughout California, more than 630 different private sector firms have worked on the program during this period. These contractors have hired workers throughout the state and have,

Faces of High-Speed Rail: Yovani Moreno

He's had lots of jobs, but a felony on Yovani Moreno's record held him at minimum wage, about $8 an hour. Today, the 34-year-old makes nearly $24 an hour on the high-speed rail project. He became a laborer's apprentice after taking Pre-Apprenticeship Training at the Construction and General Laborers' union hall in Fresno. He's moved beams, laid concrete, handled traffic control and more. "I come home tired but loving it," Moreno said. "I can pay my bills on time. And when my daughter's birthday comes up, I can throw her a birthday party and buy her a nice gift."

in turn, paid suppliers for goods and services further stimulating industries statewide. Together, these direct and indirect results have induced wider economic activity by pumping money back into California's local economies. Overall this investment has resulted in 19,900 to 23,600 job-years of employment and generated $3.5 to $4.1 billion in total economic activity.

Direct impacts are those supported by direct high-speed rail investment, including state employees and prime and subcontractors employing construction workers, planners, engineers, and others. Indirect impacts are one step removed and represent spending on goods and services that support direct investment, such as concrete supply and machine rental companies. As the income earned by employees supported by direct and indirect investment gets spent elsewhere in the economy, this supports induced impacts in places such as the local coffee shop, restaurant, or grocery store. Labor income refers to all forms of employment income associated with the activity, including employee compensation (wages and benefits) and proprietor income. Lastly, economic output represents the value of all sales of goods and services in the production process of direct, indirect, and induced activities. The vast majority of this economic activity has taken place in the State of California, with 94 percent of spending in the state, boosting California's economy. Additionally, about 70 percent of the $2.3 billion spent was funded by the American Recovery and Reinvestment Act (ARRA), infusing the state's economy with federal dollars. The deadline to expend ARRA funds is September 20174, and forecast spending of approximately $1 billion during FY 2016-2017 will support approximately 12,000 additional job-years. See Table 1.0 below.

What is a Job-Year?

Job-years represent a combination of total jobs and the length of time of those jobs; e.g., one job supported for five years equals five job-years; five jobs supported for one year also equals five job-years.

TABLE 1.0 CALIFORNIA ECONOMIC IMPACTS JULY 2006 – JUNE 2016[1]

	Job-Years of Employment	Labor Income	Economic Output
Direct	8,900 - 10,500	$730M - $900M	$1,600M - $1,900M
Indirect	5,000 - 6,000	$330M - $390M	$900M - $1,000M
Induced	5,900 - 7,100	$320M - $390M	$1,000M - $1,200M
TOTAL	**19,900 - 23,600[2]**	**$1.38B - $1.68B**	**$3.5B - $4.1B**

1 - More Information: ***http://hsr.ca.gov/docs/newsroom/fact%20sheets/Economic_Impact.pdf***
2 - Totals may not sum due to rounding

Within the state, the Central Valley has experienced the most substantial economic results as construction has started and ramped up over the past few years. The impact of the high-speed rail investment between July 2015 and June 2016 is equivalent to about 11 percent of the 32,000 jobs that the Central Valley economy added over the same period. In Fresno County, where most construction activities are currently taking place, the high-speed rail investment is equivalent to roughly 29 percent of the total jobs added during this time period, with direct jobs being about 17 percent.

The Authority's Community Benefits Policy and subsequent Agreement, established in 2012, is designed to assist small businesses and jobs seekers in finding or obtaining construction contracts, jobs and training opportunities for residents who live in economically disadvantaged areas along the high-speed rail alignment. The Agreement supports employment of individuals who reside in Disadvantaged Areas and

those designated at Disadvantaged Workers, including veterans. Following these policies, the program ensures that 30 percent of all project work hours are performed by National Targeted Workers, and at least 10 percent of those work hours are performed by Disadvantaged Workers. For more information about this policy see ***www.hsr.ca.gov/docs/brdmeetings/2012/December/brdmtg1212_bot3.pdf***

At the same time, two federal reports have recently been released that underscore how investments in California's high-speed rail program have resulted in economic benefits and job creation in the Central Valley:

- A U.S. Department of Transportation report, ***Shovel Worthy: What the Recovery Act Taught Us About Investing in Our Nation's Infrastructure***. This publication highlights how federal stimulus fund investments in the Central Valley have led to an economic turnaround in the region.
- A U.S. Treasury Department report, ***40 Proposed U.S. Transportation and Water Infrastructure Projects of Major Economic Significance***. This publication shows that California's high-speed rail program as having the third-highest economic benefit of major infrastructure investments across the country.

MEETING SMALL BUSINESS PARTICIPATION GOALS

In 2012, the Authority established its Small and Disadvantaged Business Enterprise Program to ensure that small businesses, inclusive of Disadvantaged Business Enterprises (DBE) and Disabled Veteran Business Enterprises (DVBE), are afforded every practicable opportunity to participate in the high-speed rail program. The Small Business Program is consistent with state and federal law and established a 30 percent small business participation goal. Since then, the Authority has been actively engaging with the small business community and contractors through a variety of methods, including:

- **Business Advisory Council –** This group meets bi-monthly and serves as a forum to provide input and advice in implementing best practices for the small business community. It is also a valuable resource for expanding the network of small and disadvantaged businesses.
- **Small Business Certification Workshops –** From January 2015 to January 2016, the Authority joined forces with the California Department of General Services to conduct a series of free on-the-spot small business certification workshops, with nearly 400 small business participants attending, and with almost 100 firms receiving certifications.

Creating Job Opportunities for Disadvantaged Workers

The Community Benefits Agreement contains a Targeted Worker Program to ensure that 30 percent of all project work hours are performed by National Targeted Workers, and at least 10 percent are performed by Disadvantaged Workers.

A Targeted Worker is an individual whose primary place of residence is within an Economically Disadvantaged Area or an Extremely Economically Disadvantaged Area in the United States.

A Disadvantaged Worker is an individual who prior to commencing work on the high-speed rail project meets the income requirements of a Targeted Worker and faces at least one of the following barriers to employment:

- Being a veteran
- Being a custodial single parent
- Receiving public assistance
- Lacking a GED or high school diploma
- Having a criminal record or other involvement with the criminal justice system
- Suffering from chronic unemployment
- Emancipated from the foster care system
- Being homeless or
- Being an apprentice with less than 15 percent of the required graduating apprenticeship hours in a program

To learn more, visit: ***www.hsr.ca.gov/docs/newsroom/fact%20sheets/CBA_Factsheet_FINAL_0050415.pdf***

SMALL BUSINESS PARTICIPATION
AS OF OCTOBER 2016
334 Certified Small Businesses working on the high-speed rail program statewide
102 Certified Disadvantaged Business Enterprises
39 Certified Disabled Veteran Business Enterprises
NORTHERN CALIFORNIA:
122 Certified Small Businesses
CENTRAL VALLEY:
85 Certified Small Businesses
SOUTHERN CALIFORNIA:
115 Certified Small Businesses
OUTSIDE OF CALIFORNIA:
12 Certified Small Businesses

- **Direct Small Business Outreach –** Authority staff average over 70 speaking engagements per year at conferences, workshops and expos, resulting in thousands of direct touchpoints with the small business community.
- **Newsletter –** A Small Business Newsletter is issued quarterly documenting the progress of the program, the contributions of small businesses in building high-speed rail, and outlining how small businesses can connect with the Authority in pursuing contracting opportunities.
- **Conferences & Forums –** Pre-bid conferences and industry forums are typically held as part of the Request for Proposals or Request for Qualifications process. These events serve as an opportunity for small businesses to meet with potential primes to explore subcontracting opportunities.
- **Partnerships –** The Authority continues to partner with local stakeholders to direct potential job seekers to existing job training opportunities for high-speed rail construction work.

Since implementing the small business goals in August 2012, the Authority's Small and Disadvantaged Business Enterprise Program has paid more than $196 million to certified Small, Disadvantaged and Disabled Veteran Business Enterprises in California for their work on the program through June 2016. For the same period, professional services contractors have collectively met the 30 percent small business utilization target, while design-build contractors are working to attain their utilization target as construction activities ramp up. As of October 2016, 334 small businesses are either committed, utilized, or actively working on the project. Additionally, as of October 2016, 102 certified Disadvantaged Business Enterprises and 39 certified Disabled Veteran Business Enterprises have been engaged with the high-speed rail program.

BENEFITING DISADVANTAGED COMMUNITIES

Through June 2016, 52 percent of project expenditures have occurred in designated disadvantaged communities throughout California, spurring economic activity in these areas. Construction of the system benefits disadvantaged communities (as identified by the California Environmental Protection Agency) by providing career opportunities. Construction has already resulted in over a thousand job-years of employment in disadvantaged communities throughout the State.

Our approach to green practices and sustainable operations also benefits disadvantaged communities. High-speed rail will provide California residents now and in the future with a clean, sustainable travel mode that will help reinforce improving overall community health and benefit the state for years to come. Current sustainability benefits include the use of Tier 4 equipment when possible at construction sites. Tier 4 engines help reduce Nitrogen Oxide, and reduce particulate matter and other pollutants. Additionally the Authority has a MOU with the San Joaquin Valley Air Pollution Control District that outlines a process for detailed Voluntary Emission Reduction Agreements (VERA) as the Authority builds out the high-speed rail project within the District boundaries. The MOU will ensure that while thousands of Valley residents get to work on construction of the project, their families and communities will not suffer negative impacts from the construction emissions and other pollutants.

Ultimately, once completed and operational, the system will provide greater mobility by improving access to jobs, schools, and businesses for disadvantaged community residents.

Faces of High-Speed Rail: O'Dell Engineering

O'Dell Engineering is a Modesto-based certified small business working on the program doing right-of-way and surveying work. The company began working on the project as a subcontractor in 2011, but since has become a prime contractor and its workforce has grown from 15 to 55 employees. O'Dell's work on the program has led to an expansion of its Fresno office, which has allowed them to gain additional work outside of high-speed rail.

ADVANCING ENVIRONMENTAL CLEARANCE

In order to work more closely with our partners in managing environmental reviews and, in part, to manage schedule risk, we are improving on how we advance environmental clearance and update the environmental review schedule. The 2016 Business Plan established a very important goal – to make the Phase 1 system between San Francisco and Los Angeles/Anaheim shovel ready as quickly as possible. To achieve that, the Authority established a timeline to achieve environmental clearance on all project sections by the end of 2017. The Authority remains committed to completing environmental reviews

TABLE 1.1 PROJECTED ENVIRONMENTAL SCHEDULE

SECTION	ANTICIPATED RECORD OF DECISION
San Francisco to San Jose	2018
San Jose to Merced	2018
Merced to Fresno Central Valley Wye	Completed 2018
Fresno to Bakersfield Locally Generated Alternative	Completed 2018
Bakersfield to Palmdale	2018
Palmdale to Burbank	2018
Burbank to Los Angeles	2018
Los Angeles to Anaheim	2018
Los Angeles to San Diego (Phase 2)	TBD
Merced to Sacramento (Phase 2)	TBD

*Projected dates are still undergoing development with the Federal Railroad Administration.

Requesting Expedited Environmental Review

On February 24, 2017, Governor Brown, in response to the Trump Administration's recent Executive Order 13766, sent to the President and the Acting Chair of the Council on Environmental Quality a letter requesting the expedited federal environmental review of 10 of California's highest-priority infrastructure projects, of which high-speed rail was included. The President's Executive Order, which allows for the expediting of environmental review and approval for high-priority infrastructure projects, is intended to cut through federal red tape and would help position the high-speed rail program to be ready to utilize future funding as well as to continue creating thousands of jobs in communities throughout the state. See the request here - ***www.gov.ca.gov/docs/2.24.17_Infrastructure_Letters.pdf***

expeditiously in order to provide clarity to local communities, stakeholders and regional partners as to the route and station locations, and to be shovel ready in order to build out the system and facilitate intermediate improvements as funding is available.

The ability to expedite these reviews depends on many factors that the Authority is not able to fully control. For example, advancing environmental clearance involves working with multiple partners (e.g., Federal Railroad Administration, U.S. Army Corps of Engineers, etc.) each of which are required to comply with, or address their own statutory mandates, and/or may face resource constraints. These constraints can be mitigated through changes in process and/or new statutory or regulatory changes.

In response, we are improving on how we advance environmental clearance in two very important ways. First, we are now identifying a preferred alternative in advance of issuing the draft environmental documents, as required by recent environmental streamlining legislation, instead of deferring it until the end of the process.[2] Second, although we previously planned to complete all environmental clearances by December 2017, together with our partner, the Federal Railroad Administration, we have updated our schedule to provide more involvement with our broad range of project partners, particularly on complex technical and/or environmental issues. This schedule is still undergoing development with the Federal Railroad Administration.

Preferred alternatives have already been identified for the Central Valley Wye and the Bakersfield Locally Generated Alternative, and we are targeting identifying all preferred alternatives and issuing draft environmental documents by or before the end of 2017 for the remaining Phase 1 project sections. This reflects the Authority's commitment to collaborate with our partners and ensure that the high-speed rail system fulfills its objectives, minimizes impacts, protects the environment, and enhances communities.

This updated schedule will not affect the delivery of the Silicon Valley to Central Valley Line as described in the 2016 Business Plan. Potential delays will be mitigated in a number of ways including: advancing preliminary engineering further than we might otherwise have done before handing the design to a design-build contractor; having procurements ready to issue once environmental clearance is achieved; and conducting right-of-way mapping and surveying prior to final environmental clearance, which will position the Authority to move quickly into the acquisition process.

PROCUREMENT OF AN EARLY TRAIN OPERATOR

The 2016 Business Plan laid out the business model for delivering and operating the high-speed rail system. It described the operator's role as covering both a pre-operations phase, where the operator will advise the Authority on the planning, design and construction of the system, and an early operations phase, where the operator provides the actual operation of passenger service and works to build the market once the system is built. These two roles are being combined so that there is continuity between the advice offered by an Early Train Operator during the project development phase and the actual operations that the operator will perform once the system goes into service. The idea to combine these

two phases came from discussions with the rail industry, as well as through an unsolicited proposal that the Authority received consistent with its unsolicited proposals policy.

Ultimately, the high-speed rail system will be a commercial enterprise that, consistent with Proposition 1A, will not require an ongoing subsidy. A fundamental goal of the program is to create a commercially-successful high-speed rail transportation system. As segments of the program are delivered, they are projected to generate significant revenues and positive cash flow which will support private investment. Over time, the value of the system as a commercial enterprise will be significant for the State of California, creating the opportunity for private investment to support expansion of the system.

To achieve that goal, and in order to ensure commercial considerations are included upfront, the Early Train Operator will be brought on board to provide advice during operational design and development. They will provide input on procurements for trains, track and systems, maintenance facilities, station design and operations, revenue collection, market brand and financial planning and modeling, including ridership estimation. The intent is that this team will be a long-term partner into the ridership ramp up and operations phases. Strategically partnering with a private sector operator will help ensure that the system is designed to enhance its ultimate commercial value and profitability. The Early Train Operator will also be able to help the Authority reduce any early-year losses as the system is ramping up and to take on the responsibility for financing those losses to be recouped out of ongoing operating revenues. Selection of an Early Train Operator is expected by the summer.

TRANSPARENCY AND OVERSIGHT

In September 2015, the Authority inaugurated a monthly Operations Report under the ongoing oversight conducted by the Board of Directors' Finance and Audit Committee. Initially the Operations Report focused primarily on monitoring the right-of-way acquisition progress in the Central Valley. Over time, the extent and rigor of the Operations Report has increased and now addresses every aspect of program delivery, including: right of way, third party agreements, project development schedules, the status of contracts (including the three Central Valley design build construction contracts), and financial performance (including federal ARRA expenditures).

Currently, 19 financial and performance reports are generated on a monthly basis, reviewed in detail at every Finance and Audit Committee meeting, and reported quarterly to the full Authority Board of Directors. The risk section is updated, monitored and tracked in real time, enabling the early identification and mitigation of all potential issues. In addition, special items or issues that may need to be addressed, such as the project development milestone schedules, are also covered in the Operations Reports. The Finance and Audit Committee reports are posted on the website for public review and its meetings—which are typically scheduled to precede the monthly Board of Directors meetings—are open to the public. The reports are also shared with the Legislature. For more information about the Finance and Audit Committee and reporting, go to ***www.hsr.ca.gov/Board/index.html***.

The California High-Speed Rail Peer Review Group (PRG) was established by the California Legislature in 2008 (Assembly Bill 3034) to provide oversight on behalf of the Legislature. Specifically, the PRG is charged with evaluating the Authority's funding plans and business plans and preparing its independent judgment as to the feasibility and reasonableness of the plans, assumptions, analyses, estimates,

and any other observations or evaluations it deems necessary. The PRG has issued several statements and letters to the Legislature regarding its reviews, which can be found on the Peer Review Group's website. Additionally, to provide an at-a-glance tool to the Legislature, the PRG has worked with the Authority to develop a set of broad "dashboard" indicators meant to give the Legislature an overall perspective from period to period of how the project is progressing and of where problems might be arising. Three dashboards have been submitted to date – the most recent in February 2017. Information on the Peer Review Group's work can be found at: ***www.cahsrprg.com/index.html***.

2. Project Update By Section

PHASE 1 SYSTEM: INTRODUCTION

Work is advancing on every mile of the Phase 1 system – San Francisco/Merced to Los Angeles/Anaheim – and planning work is continuing on the Phase 2 sections – Merced to Sacramento and Los Angeles to San Diego. Construction is proceeding along a 119-mile alignment in the Central Valley from Madera to North of Bakersfield. In addition, two supplemental environmental analyses are being completed in the Central Valley, one to identify the alignment into Bakersfield and one for the Central Valley Wye, which will connect tracks branching off from the main line and serve as the junction for trains headed northwest to the Bay Area or north to Sacramento and south to Southern California.

Engineering, environmental analysis and public outreach is also progressing in the Northern and Southern California project sections. The Authority is working to environmentally clear every Phase 1 project section in order to provide clarity to local communities and jurisdictions as to the route that the system will take and to make them shovel ready as funding becomes available.

Moving the environmental process forward to completion involves a number of steps, including:

- Identifying a preferred alternative in the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS).
- Holding a 45-day public comment period, which includes a formal hearing and open house community meetings.
- Preparing a Final EIR/EIS in which public and stakeholder comments are addressed.
- Issuing a Final EIR (CEQA) for certification by the Board of Directors as a Notice of Determination (NOD) and Final EIS (NEPA) for a Record of Decision (ROD) by the Federal Railroad Administration and authorization from the Surface Transportation Board.

NORTHERN CALIFORNIA

Northern California includes three project sections: San Francisco to San Jose, San Jose to Merced and Merced to Sacramento. Both San Francisco to San Jose and San Jose to Merced sections have active environmental analyses underway. Community engagement in both of these sections continues to be an essential part of this process as the Authority works toward environmental clearance. While the environmental process moves toward its conclusion, the Authority is collaborating with its Northern California partners, communities, and stakeholders to prepare for the next steps toward passenger rail service for the Silicon Valley to the Central Valley Line as outlined in the 2016 Business Plan.

SB 1029 PROJECT UPDATE REPORT

Section (a)

A summary describing the overall progress of the project.

HIGH-SPEED RAIL BY PROJECT SECTION
SACRAMENTO
NEVADA
SAN FRANCISCO
SAN JOSE
MERCED
FRESNO
BAKERSFIELD
PALMDALE
BURBANK
LOS ANGELES
ANAHEIM
SAN DIEGO
LEGEND
Section Limits
N
0 15 30
Miles

SAN FRANCISCO TO SAN JOSE

The San Francisco to San Jose project section is part of the first phase of the California high-speed rail system, which will connect communities from San Francisco and the Silicon Valley to the rest of the state. The approximately 51-mile project section will have stations in San Francisco (at the Transbay Transit Center and 4th and King), Millbrae (SFO) and San Jose (Diridon).

The San Francisco to San Jose project section differs from other project sections because the alignment has been defined by state legislation, SB 1029, and regional, multi-agency agreements. Per the requirements of SB 1029, high-speed rail service along the San Francisco to San Jose corridor will be implemented as blended service, with Caltrain and high-speed rail service predominantly sharing tracks.

Caltrain Modernization Program

In January 2015, the Peninsula Corridor Joint Powers Board, the entity which owns and operates Caltrain, completed the necessary environmental reviews for the electrification project, allowing this transformational investment to move forward. The project will also measurably improve the performance, operating efficiencies, and capacity of Caltrain's commuter rail service. Caltrain estimates that electrified service will increase ridership and fare revenue while decreasing fuel costs. In September 2016, Caltrain awarded contracts to Balfour Beatty to finish the design and construct the electrification infrastructure, and to Stadler to manufacture the high-performance electric trains for commuter rail service. However, the Trump Administration recently deferred a final decision on a grant that is also key to funding this project and federal action is still pending as this report is being released. Governor Edmund G. Brown Jr. has sent a letter to United States Department of Transportation Secretary Elaine Chao urging her to approve the Caltrain grant, and the Authority will continue to work with Caltrain to advance this critical project.

Collaboration between the Authority, Caltrain, Bay Area partners and stakeholders is proceeding through current outreach activities. Activities in this corridor, including scoping, environmental analysis and community engagement, have substantially increased throughout 2016 and into 2017.

Through SB 1029, the Legislature provided funding support of electrification of the Caltrain corridor as the first stage of

Caltrain Corridor

The Caltrain Modernization Program, scheduled to be implemented by 2021, will electrify and upgrade the performance, operating efficiency, capacity, safety and reliability of Caltrains commuter rail service between San Francisco and San Jose. High-speed rail's investment of $713 million towards these improvements will allow the high-speed rail system to eventually blend with the Caltrain commuter system.

Transbay Transit Center

The Transbay Transit Center will eventually connect the eight counties of the San Francisco Bay Area through 11 transit systems: AC Transit, Amtrak, BART, Caltrain, Golden Gate Transit, Greyhound, High-Speed Rail, San Francisco Municipal Transportation Agency, SamTrans, WestCAT Lynx and Paratransit. It will ultimately serve as the northern California hub for future high-speed rail service from Los Angeles to San Francisco. The Transbay Transit Center received a $400 million contribution in Authority funding through the federal government's High-Speed Intercity Passenger Rail Program, via the American Recovery and Reinvestment Act (ARRA).

high-speed rail implementation that would have independent utility. This contribution was documented in a Memorandum of Understanding (MOU) executed in January 2013. In 2016, the Authority and six other partners agreed to execute a supplement to the MOU, and the Authority's funding contribution was increased by an additional $113 million. These funds are advancing primary elements in support of future high-speed service, including electrification of the Caltrain system between Tamien Station in San Jose and the Caltrain terminal at 4th and King in San Francisco.

Additional work that is being funded by the Authority includes safety improvements, operational improvements and station area planning work. SB 1029 also dedicated additional funds, detailed further in the Milestones Section of this report, for Caltrain positive train control and communications improvements in the corridor, and improvements to the Central Subway, BART train and maintenance facility improvements and Capitol Corridor improvements. These elements will increase transit capacity in the region and allow for cleaner, faster travel, providing early benefits to local communities.

The 4th & King Street Station in San Francisco, Millbrae/SFO, and the San Jose Station at Diridon are currently under environmental review, while construction of the Transbay Transit Center in downtown San Francisco is expected to be complete in late 2017.

Ongoing public engagement is essential in this corridor, and the Authority is convening community working groups, open house community meetings, and collaborating with Caltrain to alternately host both a Local Policy Makers Group (LPMG) and a City/County Staff Coordinating Group (CSCG). These two groups function as well-established forums of outreach to stakeholders and communication with elected officials and city and county staff, which provides a collaborative process for sharing information and seeking input and comments.

In 2016, the Authority procured an engineering and environmental (E&E) consulting team led by HNTB to provide essential environmental and engineering services in this section as well as in the San Jose to Merced Section. In 2016, the environmental scoping process for this section began in the spring, with a final scoping report issued in October. Ongoing technical analysis continues with plans for the Board of Directors to identity a Preferred Alternative in fall 2017, which will be included in the Draft EIR/EIS for public review and comment.

Among other things, the Authority is studying the near-term benefits of safety improvements to this densely developed corridor. Key project elements under evaluation include at-grade crossings, traffic studies, perimeter fencing, four-quadrant gates, and channelization of at-grade crossings.

A light maintenance facility is also being studied in the environmental review process for this section. Alternatives under consideration include sites to the east and west of the existing Caltrain tracks. Currently, a 90 to 110 acre site in the Brisbane area is under review. The planning and construction of this facility will provide localized near-term benefits, as well as create new skilled jobs.

Next Steps: Technical analysis and community outreach will continue to support the identification of a staff recommended preferred alternative for consideration by the Board of Directors in summer 2017 and issuance of the Draft EIR/EIS for public review in late 2017. The Authority will continue to collaborate with Caltrain to develop a safe, modern, and urban corridor allowing for blended operations with other rail providers to maximize the use of this constrained corridor. Work will also continue with station cities, including Millbrae and San Francisco, to understand how joint operations at existing Caltrain stations at Millbrae and 4th and King will evolve over time.

The Authority will continue to coordinate with the City of San Francisco and the Transbay Joint Powers Authority on the Downtown Extension Project that will allow for a final rail connection to the Transbay Transit Center. Outreach will continue over the next year with the public, local jurisdictions, environmental justice communities and other stakeholders along the corridor as technical studies and environmental reviews are completed in 2018.

SAN JOSE TO MERCED

The San Jose to Merced project section is part of the first phase of the high-speed rail system and will provide an important rail link between the Silicon Valley and the Central Valley. The approximately 85-mile project section will connect stations in San Jose (Diridon), Gilroy and (passing through the Central Valley Wye) north to Merced and south to Fresno.

The project section generally follows the Caltrain corridor and then the Union Pacific Rail Road (UPRR) corridor through San Jose. From south of San Jose through Morgan Hill and Gilroy, the corridor could traverse either east of the UPRR corridor or along US 101. From Gilroy, the corridor extends east through the Pacheco Pass, generally following State Route 152, and then along Henry Miller Road up to Carlucci Road, approximately 8 miles east of Los Banos in Merced County.

Station locations studied in this project section include Diridon Station in San Jose, and a station

San Jose Diridon Station

Connecting high-speed rail into the Diridon Station in San Jose (the tenth largest city in the nation) will provide connections to Bay Area Rapid Transit (BART), Altamont Corridor Express, Caltrain, Santa Clara Valley Transportation Authority light rail and buses, Amtrak's Coast Starlight service and the Capitol Corridor (Amtrak). In April 2016, the Authority entered into a station area planning agreement with the City of San Jose and transportation partners to develop new intermodal transportation opportunities in the region and encourage transit-oriented development and smart growth policies around it.

Members of the public were invited to attend open house community meetings for the San Jose to Merced project section to learn more about potential alignments under consideration.

in either Downtown Gilroy or East Gilroy. Diridon Station in San Jose is being planned as a transformative community asset, offering multimodal connectivity with a wide range of transportation services, including: Caltrain, Bay Area Rapid Transit, (Santa Clara) Valley Transit Authority, Altamont Corridor Express, and Capitol Corridor, among others. For a number of years, the Authority has been working with stakeholders and local communities, to identify and evaluate potential alignments and planning alternatives. Throughout the past year, the Authority has been a partner with these agencies in an intermodal working group whose members have a role in the planning and development of the station and the surrounding area.

In 2016, the Authority procured an engineering and environmental (E&E) consulting team led by HNTB to provide essential environmental and engineering services in the San Jose to Merced project section. Activities have also increased to include a robust outreach program coordinated with and supporting the environmental review process. Throughout 2016, community open house meetings, technical and community working groups were held. These meetings were designed to create and maintain a collaborative and informative conversation with stakeholders, environmental justice communities and residents along the alignment.

This outreach is essential to help the Authority develop and evaluate a refined range of alternatives that will allow staff to identify a preferred alternative, which is part of the environmental process outlined in the Schedule Section of this report.

Next Steps: Outreach and community engagement will continue along the corridor to gather input and feedback from the public, local communities, environmental justice communities and other stakeholders related to ongoing environmental reviews and station area planning studies. Environmental and technical analysis will continue with a staff recommended preferred alternative expected in summer 2017 and the release of a Draft EIR/EIS towards the end of the year. In addition, station area planning efforts will continue in advance of station design for the cities of Gilroy and San Jose.

The Authority will also be preparing for property acquisition activities and construction on this segment of the Silicon Valley to Central Valley Line by preparing procurement documents in anticipation of the completion of the environmental documentation. Work has already begun on critical geotechnical research related to the tunnel section through the Pacheco Pass in order to provide detailed information to potential contract bidders.

CENTRAL VALLEY

The Central Valley, which includes the Merced to Fresno and Fresno to Bakersfield project sections, serves as the backbone of the initial passenger rail service from Silicon Valley to the Central Valley. While the primary environmental processes have been completed to allow construction within portions of the two project sections, some additional engineering and environmental analysis remains at both ends of this corridor. Supplemental documents related to the Central Valley Wye, in the north, and the Bakersfield Locally Generated Alternative in the south, are being prepared and will be available for public review and environmental clearance and alignment selection, allowing construction to expand.

Construction Progress

Final design and construction is underway between Madera and Kern Counties. This work is covered by three design-build contracts covering 119 miles and an inter-agency agreement with the California Department of Transportation (Caltrans) for work on State Route 99:

- **Construction Package 1 (CP 1) – *Civil Infrastructure* –** Avenue 19 (Madera) to East American Avenue (Fresno), 32 miles, awarded to Tutor Perini/Zachry/Parsons (TPZP), a Joint Venture, in August 2013.

Tutor Perini • ZACHRY • PARSONS
a joint venture

- **State Route 99 Realignment – *Civil Infrastructure* –** Realignment of State Route 99 from Clinton Avenue to Ashlan Avenue through Fresno, executed in February 2013.

Caltrans

- **Construction Package 2-3 (CP 2-3) – *Civil Infrastructure* –** East American Ave (Fresno) to one-mile north of Tulare/Kern County line, 65 miles, awarded to the Dragados/Flatiron, a Joint Venture (DFJV) in June 2015.

DRAGADOS FLATIRON

- **Construction Package 4 (CP 4) – *Civil Infrastructure* –** One-mile north of Tulare/Kern County line to Poplar Avenue north of Bakersfield, 22 miles, awarded to California Rail Builders (CRB) in February 2016.

CALIFORNIA RAIL BUILDERS

The Authority has also awarded contracts to three Project Construction Manager (PCM) teams to oversee the day-to-day construction for each design-build contract. These contracts include:

- Wong+Harris for Construction Package 1
- Arcadis for Construction Package 2-3
- HNTB for Construction Package 4

ACTIVE CONSTRUCTION PROJECT SITES

Current Activities on Construction Package 1

Construction activities on the high-speed rail system in the Central Valley have resulted in significant progress being made over the last two years, with work expanding to more than 119-miles of the spine of the system. In Madera and Fresno Counties, there is visible work along nine locations where structures are taking shape that will support passenger rail service connecting the Central Valley to the Silicon Valley.

Sites along the alignment under construction include:

1. **AVENUE 8 (MADERA COUNTY) –** Among the newest construction is a 100-foot overcrossing at Avenue 8 near Madera that will safely take traffic over future high-speed rail and existing BNSF rail lines. Currently, thousands of cubic yards of fill material is being trucked in and compacted. Retaining walls have been constructed to create the passageway for high-speed trains and the height of the new structure can be seen from State Route 99.

2. **FRESNO RIVER VIADUCT (MADERA COUNTY) –** All concrete has been poured for the deck of the Fresno River Viaduct in Madera County, bringing this 1,600-foot long structure closer to completion. Closure pours, expansion joints and barrier walls will be completed over the next couple months. The viaduct will span from Raymond Road to Watson Street across the Fresno River and State Route 145, and will run parallel to the BNSF tracks.

3. **COTTONWOOD CREEK BRIDGE (MADERA COUNTY) –** Located northeast of the intersection of Avenue 13 and Road 30 ½, the 250-foot long, 43-foot wide span will carry high-speed trains over the creek bed. The structure is complete, including barrier walls and a concrete bridge deck.

4. **ROAD 27 OVERPASS (MADERA) -** The project's newest construction site is progressing on Road 27 in the Madera Acres neighborhood north of Madera. The roadway is closed until late 2017 for the construction of a grade-separated overpass. Columns to support the overpass are under construction and initial column drilling has been completed on the north side. These improvements will allow Road 27 traffic to safely cross both the BNSF railroad tracks and the high-speed rail lines.

5. **SAN JOAQUIN RIVER VIADUCT (NORTH FRESNO) –** The 4,700-foot structure will span the San Joaquin River in north Fresno and the Union Pacific tracks parallel to State Route 99. This viaduct will feature arches representing the northern gateway into Fresno and pergola structure in order to cross over the top of the Union Pacific tracks. Crews are drilling and installing rebar columns for support piers for the pergola structure along the railroad tracks east of State Route 99. When complete, the San Joaquin River Viaduct will be the longest structure on this first phase of high-speed rail construction.

6. **STATE ROUTE 99 REALIGNMENT (FRESNO COUNTY) –** This high-speed rail project, with the California Department of Transportation (Caltrans) serving as the Authority's contractor, is moving State Route 99 from Clinton to Ashlan approximately 100 feet to the west to make way for the high-speed rail line. New pavement can be seen in Fresno for what will become new travel lanes, while utility relocation and installation of sewer lines continues farther north.

7 **FRESNO TRENCH & STATE ROUTE 180 PASSAGEWAY (FRESNO) –** An approximately two-mile trench, 40-feet deep, is being constructed. This trench starts between Olive and Belmont Avenues, and runs to Stanislaus Street in Downtown Fresno. This will allow high-speed trains to cross under State Route 180, a rail spur off of the San Joaquin Railroad, Union Pacific tracks, and the Dry Creek Canal. Stage 1 of the trench construction is underway, which includes the first lane shift of westbound traffic on State Route 180 onto the eastbound side of the highway. This allows crews to work below State Route 180 to construct protective barrier walls and begin excavation between high-speed rail and Union Pacific Railroad lines and tunnel under the highway. Trench excavation is underway and dirt is being used elsewhere as fill. While lanes will shift as construction progresses, State Route 180 will remain open to traffic.

8 **TUOLUMNE STREET BRIDGE (DOWNTOWN FRESNO) –** This new, higher bridge will accommodate two-way traffic into downtown Fresno, replacing what was once a one-way road. The bridge is being built so that the highest point is shifted to the west to accommodate clearance for high-speed rail trains. Construction of the new bridge is nearing completion as concrete has been poured for the sidewalks and barrier rails. Final utility relocation is beginning at the east end of the bridge, which will allow the new structure to be tied in to Tuolumne Street and reopened to traffic.

9 **CEDAR VIADUCT (SOUTH FRESNO) –** Along State Route 99 near the intersection of North and Cedar Avenues, steel-support falsework has been assembled around the 3,700-foot Cedar Viaduct structure and concrete pours for the viaduct deck have begun. Work is beginning on three additional columns at the south end of the structure near Muscat Avenue. This feature of the bridge will include concrete arches and serve as a southern gateway to high-speed rail in Fresno County. When complete, the Cedar Viaduct will carry the high-speed rail trains over State Route 99.

Construction Package 1 Extension

In March 2016, the Authority extended the northern terminus of Construction Package 1 (CP 1) nearly three miles from Avenue 17 in Madera County northward to approximately Avenue 19. The extension better ensured compliance with the terms of the federal grant agreement, including the expenditure of American Recovery and Reinvestment Act funds. It also advances the work towards Merced on an environmentally cleared section and provides the capability for a more logical connection and transfer point near the existing Madera Amtrak Station. The extension also allows for a stop in Madera, which will provide enhanced connectivity with San Joaquin intercity passenger service as a critical link in the Silicon Valley to Central Valley Line.

Construction Package 2-3 Progress

Construction Package 2-3 is the second major design-build construction contract extending approximately 65 miles south from the terminus of Construction Package 1 at East American Avenue in Fresno to one-mile north of the Tulare/Kern county line. This package includes a large number of grade separations, including viaducts, underpasses and overpasses, which significantly improves safety and enhances environmental quality due to reduced traffic congestion at existing railroad crossings. A project office in Selma has been opened by design-build contractor Dragados/Flatiron (DFJV).

The team has been working on alternative technical design concepts and completing contractor-required environmental clearances and permitting since fall of 2015. A key alternative technical concept proposed by DFJV changes sections of the trackway alignment from an overhead viaduct to a raised earth embankment in order to reduce construction costs. In support of the design effort, geotechnical exploration has been underway since early 2016. Drill rigs have been obtaining soil samples throughout the alignment at depths of over 100 feet. DFJV has also been performing clearing and grubbing at acquired parcels since early 2016. This has included abatement of any hazardous materials and demolition of minor structures.

The first construction work in Construction Package 2-3 getting underway in November 2016 with the building of a test berm in Fresno County. Crews in CP 2-3 have also been busy with several road paving projects.

In November 2016, crews began construction of a test berm in Fresno County alongside the BNSF railroad tracks near Manning and Cedar Avenues for the high-speed rail track foundation. Road improvements in Tulare County have also started with overlay work on two county roads. These road improvements on Road 24 and Road 40 are being made to help accommodate diverted traffic during construction.

DFJV hosts quarterly community open house meetings within the CP 2-3 project footprint. A recent event was held in Corcoran that provided current information on the project, what to expect next and to answer questions. Outreach events will be held at different locations each quarter to inform the public about the project timeline and allow for community comments.

We expect construction on CP 2-3 to ramp up considerably in 2017 and continue through 2018.

Construction Package 4 Progress

This construction contract covers a 22-mile stretch bounded by a starting point approximately one-mile north of the Tulare/Kern County line extending south to Poplar Avenue. It includes construction of at-grade, retained fill and aerial sections including grade separations, removal of two at-grade BNSF rail crossings, and approximately 1.5 miles of a temporary shoo-fly rail tracks to maintain BNSF and Amtrak service through Wasco.

The design-builder for Construction Package 4 California Rail Builders team has opened an office in the city of Wasco. The team is progressing with 60 percent design and currently has completed environmental reviews on two of three alternative technical concepts to the original preliminary designs. Current activities include pre-construction

Pre-construction activities getting underway Construction Package 4 in October with "pot holing". During this process crews locate utilities to in order to avoid them during construction. In some cases, utility relocation is necessary.

environmental surveys, biological, archaeological and cultural resource monitoring and securing the remaining necessary permits and third party agreements.

Right-of-way acquisition and pre-construction activities are also underway. The contractor has begun clearing and grubbing and demolition work at various locations. Geotechnical investigations to identify underground conditions for structures and to locate utilities is underway. This will continue at over 150 locations throughout early 2017.

Grade Separations and Roadway Improvements Will Improve Safety and the Environment

An important element of all three construction packages is an emphasis on safety and sustainability. Because high-speed trains will travel through the Central Valley at speeds in excess of 200 miles per hour, the system will be fully grade-separated. This includes the at-grade crossing at Avenue 12 in Madera, which was the site of a fatal car/train crash in 2014.

The Authority is converting 30 existing at-grade street/rail crossings in the Central Valley to grade-separated interchanges. Another 20 roadways will be rebuilt as grade separations where they cross high-speed rail lines and existing freight lines. There will be a total of 50 new, fully grade separated crossings in the Central Valley (10 existing crossings on roadways with low traffic counts will be permanently closed).

This investment, totaling more than $250 million, will allow vehicles to travel over or under existing rail lines and high-speed rail lines – which will eliminate the possibility of collisions, greatly improving safety and allowing freer-flowing vehicle traffic. In addition, approximately $500 million is being invested in local road improvement projects that are necessary due to construction impacts along the alignment and address state of good repair conditions that have languished due to limited local funding.

Grade Separation

A grade separation is a roadway that is re-aligned over or under a railway to eliminate hazards. There will be a total of 50 new, fully grade-separated crossings in the Central Valley. Benefits of grade separations include:

- Improved safety
- Reduced noise (no train horns)
- Decrease in traffic congestion
- Reduction in GHG emissions from idling vehicles
- Improved train operations reliability

Central Valley communities will benefit from these grade separations before high-speed rail service begins. The benefits of these investments include:

- **Enhanced safety –** Reducing the risk of car/rail-related conflicts and the resulting fatalities, injuries and accidents involving vehicles, pedestrians, bicyclists, school and transit buses.

- **Free flowing traffic –** Decreasing traffic delays to local motorists and businesses, reducing congestion around rail crossings, and reducing delays to emergency vehicles. An ambulance or fire truck that has to route around a blocked train crossing adds minutes to its response time, which can make all the difference in an emergency.

- **Efficient rail operations –** Improving operations on existing freight and passenger rail lines, including Union Pacific Railroad, BNSF, the San Joaquin Valley Railroad, and the San Joaquin Amtrak service, which runs on these freight lines.

- **Improved air quality –** Reducing air pollution from idling cars and trucks stuck in traffic waiting for trains to pass.

    - According to the American Lung Association, residents of the Central Valley already experience some of the worst air quality in the United States, with rates of particulate and ozone pollution that are among the worst in the nation.

    - Exhaust contains many pollutants that are linked to asthma and other lung diseases, allergies, heart disease, increased risk of infections, cancer and other health problems.

    - An operating vehicle emits a range of gases from its tailpipe into the atmosphere, one of which is carbon dioxide, the principal greenhouse gas that contributes to climate change.

Right-Of-Way Progress to Advance Construction

As construction got underway on Construction Package 1, acquiring the necessary right of way lagged behind projections. Corrective steps were quickly taken to analyze and address this challenge. This included reorganizing and enhancing the land acquisition process and instituting aggressive management and mitigation strategies, including increasing communication with agencies involved in the process. The Authority continues to focus on the delivery of key priority construction parcels through the utilization of the right-of-way settlement teams, and is partnering with its design-build contractors to prioritize parcels to advance construction. This has resulted in identifying where delays occur and addressing issues early. Additional staff training and earlier outreach to property owners has helped to identify concerns and further reduce delays. In March 2016, the Board of Directors approved additional property acquisition consultant resources to increase the parcel delivery rate. As a result of these steps, and of prioritizing parcel acquisition at key construction areas, construction in multiple locations is well underway as project momentum continues throughout the Central Valley. As of mid-February, the Authority is in possession

Faces of High-Speed Rail: Main Event Graphics

One of the first properties needed for the high-speed rail project belonged to Al Perez, owner of Main Event Graphics in Fresno. When he found out he'd have to move his printing business, he was nervous. Perez says, despite his early fears, the agents he worked with were attentive and helpful. And he says the Authority offered him fair compensation for his property and the move. Now, just four blocks away from its previous home, business is booming at Main Event Graphics. See how his new business is doing here - ***www.youtube.com/watch?v=pll_xSh-Irs***

of a total of 1,051 parcels. That's about 75 percent of all parcels necessary for CP 1, 60 percent of those needed for CP 2-3 and 25 percent of those necessary for CP 4.

Jobs and Small Business

The design-build teams utilize small businesses and various skills and crafts trades workers as each construction package progresses. As of November 2016, the contractors had paid nearly $81 million to 281 small businesses for construction services. The following summarizes activities through November 2016:

- Construction Package 1 has contracted with 114 certified small and micro businesses, 49 Disadvantaged Business Enterprises and 17 Disabled Veteran Business Enterprises. This includes many engineers, construction managers, designers and all the support personnel in the project office in downtown Fresno. Currently the CP 1 workforce consists of nearly 200 people, a number that fluctuates depending on the project schedule and needs. In addition, nearly 735 construction workers have been dispatched accounting for over 300,000 hours, 36,000 of which have been for apprentice positions. This number includes everything from carpenters and heavy equipment operators to iron workers and laborers. Over 60 percent of workers are disadvantaged workers from economically and extremely economically disadvantage areas, the majority of which are from Fresno County.

- Construction Package 2-3 has contracted with 41 small and micro businesses, 22 Disadvantaged Business Enterprises and eight Disabled Veteran Business Enterprises. Over 170 construction workers have been dispatched for nearly 32,000 hours, including nearly 200 apprentice hours. Workers from economically and extremely economically disadvantage communities comprise 65 percent of those dispatched.

- Construction Package 4 has just started and already contracted with 19 small businesses.

Faces of High-Speed Rail: Outback Materials

Outback Materials is a certified small business with headquarters in Madera County that was awarded a contract to provide concrete for the first construction package in the Central Valley. As a result of this work, Outback has hired 25 new employees, purchased over a dozen new pieces of equipment and even built a new state-of-the-art concrete plant in the City of Fresno. Hear from owner Curtis Lovett about the positive impacts high-speed rail is having on his business – ***www.youtube.com/watch?v=QoAlCTP_K8w***

In addition to supporting well-paying jobs, the high-speed rail project has also contributed to local business growth. The Quinn Company in Selma, Hertz in Fresno, and Sonsray Equipment in Stockton have all received more than $8 million from sales and from leasing construction equipment on the project. Another $2.5 million in construction materials has also been purchased locally. Everything from concrete to plywood to gravel and reinforcing steel has helped to pump money into the local economy.

In May 2016, the Center for Business and Policy Research published the California and Metro Forecast[3]. This report noted that the Fresno economy has experienced some of the fastest job growth in the state and unemployment has dropped to single-digits. It is expected that with construction on high-speed rail expanding, this will help keep the expansion going over the next two years.

Sustainable Approach to Construction

The Authority is leading the way in green practices and sustainable construction. As highlighted in the 2016 Sustainability Report, contracts with construction contractors include a range of specific methods associated with reducing greenhouse gases and other air pollutants, and increasing the recycling of materials. As part of its sustainability program, the Authority monitors several aspects of construction including waste management, cycled materials, fuel and water use and the use of environmentally-friendly equipment. Contractors are required to track and report the use of materials, fuel, water and electricity, recycling and reuse volumes, as well as the type and age of on and off-road equipment utilized.

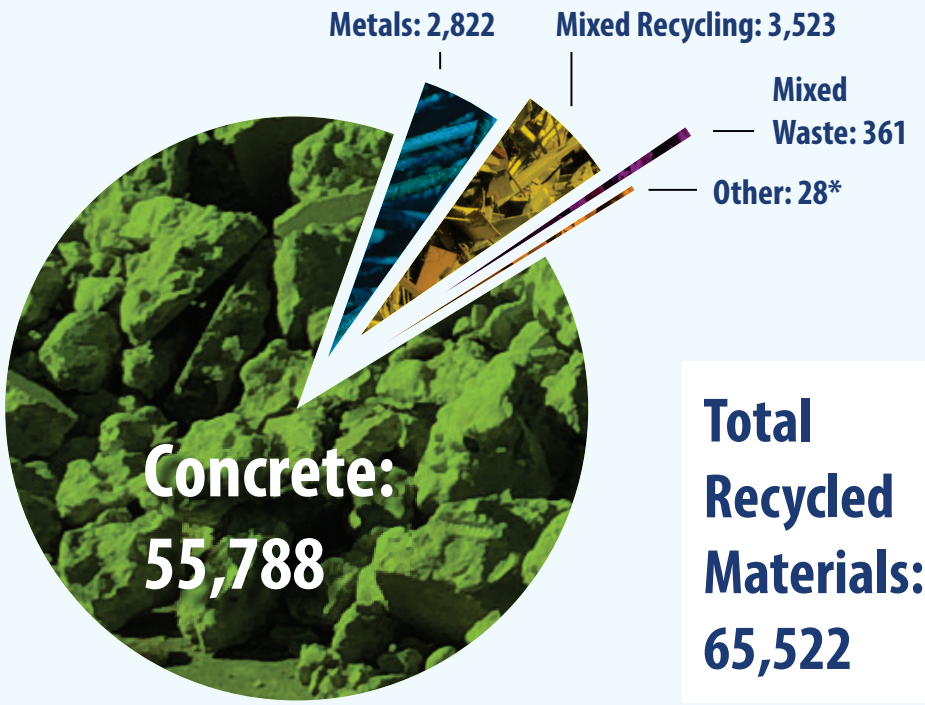
Early results show that the high-speed rail program has avoided emissions in several ways during construction:

- Prioritizing the use of renewable and bio diesel fuels
- Using more efficient vehicles by contractors
- Implementing an aggressive construction waste recycling program avoiding over 12,000 metric tons of greenhouse gas emissions through 2015

The Authority entered into a Voluntary Emissions Reduction Agreement with the San Joaquin Valley Air Pollution Control District. This agreement has involved using Air District programs to replace old, polluting farm equipment, trucks, and school buses. So far, the program has purchased 24 tractors, 12 trucks and one school bus. This has resulted in over 209 tons of lifetime pollution emission reductions. In addition, the program has avoided production of black carbon emissions through the purchase of cleaner Tier 4 construction equipment, which reduces particulate matter emissions as well as nitrogen oxide in engine exhaust by 90 percent. The requirement for clean equipment has resulted in an approximate 40 percent reduction in criteria air pollutants site-wide.

Next Steps: The Authority will complete the acquisition of all the right of way necessary to advance construction in the Central Valley. Construction will ramp up during 2018 with more construction locations coming online, and work will continue through 2019 when the three

TOTAL RECYCLED MATERIALS FROM CONSTRUCTION ACTIVITIES (IN TONS)



*Includes 1% Organics and 3% Wood

design-build construction segments and the State Route 99 construction work are scheduled to be completed. The Authority will also advance the identification of maintenance and operational facilities along the first construction segment with support from the Early Train Operator.

The process will begin for the procurement of the Track and Systems contract, which will include the design and construction of rail and the installation of electrification and high-speed rail systems to begin train testing.

SUPPLEMENTAL ENVIRONMENTAL ANALYSIS IN THE CENTRAL VALLEY

Merced to Fresno

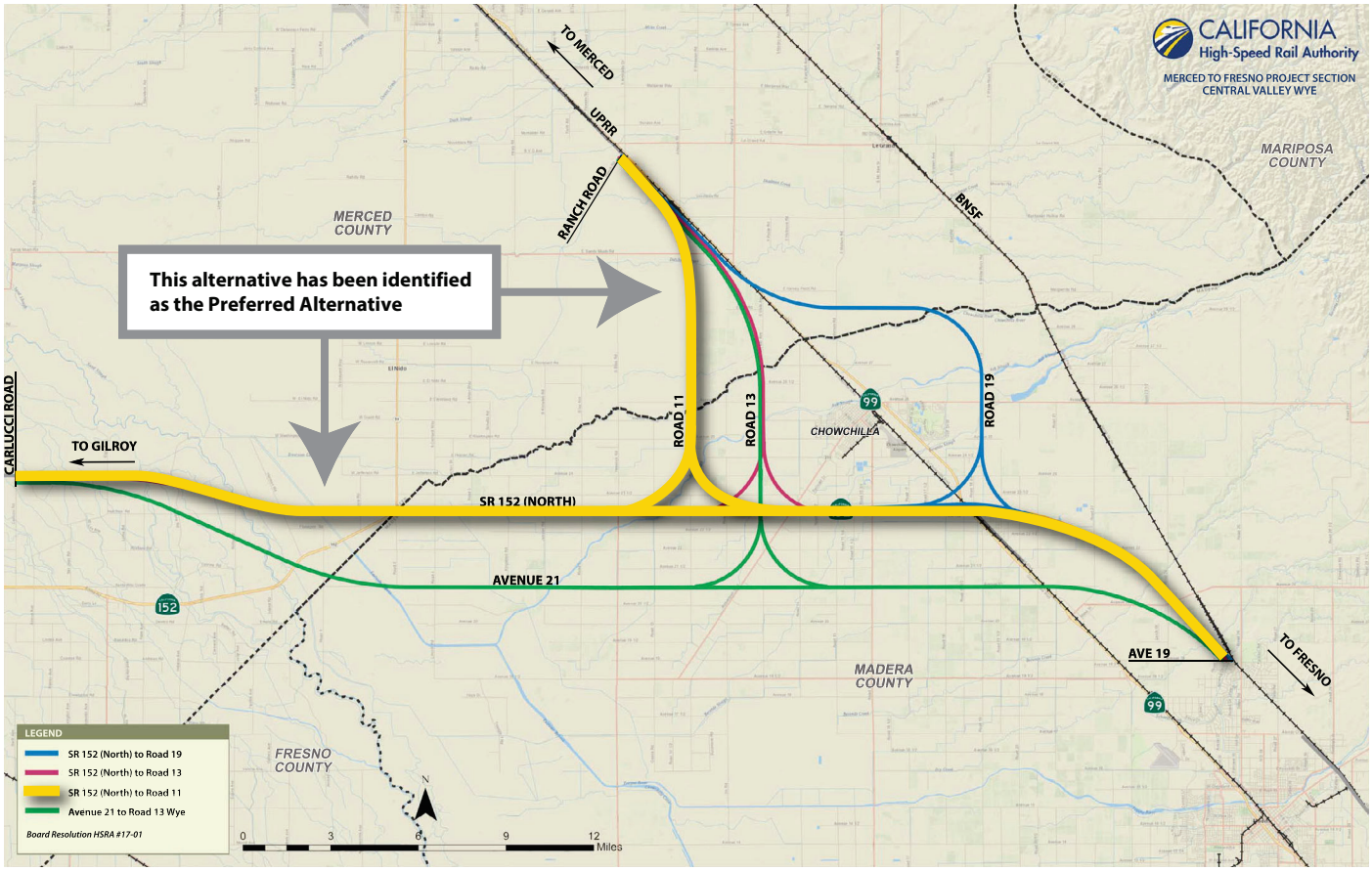
The Authority Board of Directors certified the Final EIR/EIS for the Merced to Fresno project section in May 2012. The Federal Railroad Administration issued the Record of Decision in September 2012. At that time, the Board of Directors determined that the Central Valley Wye alternatives should be further developed and evaluated in a subsequent environmental analysis. The Central Valley Wye will serve as the junction for trains that head to either northwest to the San Francisco Bay Area or north to Merced and ultimately Sacramento.

The Authority considered input from stakeholders and regulatory agencies which it used to narrow 14 separate alternatives down to four that are being evaluated as part of the Merced to Fresno Project Section Supplemental EIR/EIS. The following four Central Valley Wye alternatives share logical termini at Henry Miller Road/Carlucci Road to the west, Ranch Road/SR 99 to the north, and Avenue 19 near Madera Acres on the south.

- State Route 152 (North) to Road 13 Wye Alternative
- State Route 152 (North) to Road 19 Wye Alternative
- Avenue 21 to Road 13 Wye Alternative
- State Route 152 (North) to Road 11 Wye Alternative

In January 2017, the Board of Directors concurred with the staff's recommendation to identify the Road 11 to State Route 152 alternative as the preferred alternative in the Merced to Fresno Central Valley Wye Draft Supplemental EIR/EIS. The selection culminated many years of discussion and engagement with local communities, including Chowchilla and Fairmead, and local citizens and stakeholders.

In addition to the supplemental environmental document, station area planning work is underway with the cities of Fresno and Merced. The Authority executed agreements with these cities to assess the land uses and access around the station area to support land use and transportation planning updates. The city of Fresno anticipates completing a Master Area Plan and Implementation Strategy that will help turn the vision of the Fresno Station District into reality. This work is to leverage investment in the area, fuel economic development and ensure attention and investments surrounding the station. Merced is in the process of developing a District Scale Plan after holding public meetings in late 2016. This joint effort will create a vision for the station area and identify plans to generate economic development through enhanced access.



Next Steps: The Merced to Fresno Central Valley Wye Draft Supplemental EIR/EIS is expected to be released for public review and comment in summer 2017. The Authority will continue to work with communities and stakeholders as it works toward final environmental clearance in 2018. In anticipation of completion of the environmental document, procurement documents will be drafted so construction can continue for the Silicon Valley to Central Valley Line. In addition, as stated in the 2016 Business Plan, the Authority will work with the City of Merced to identify additional funding in order to pursue construction of a potential single track extension from Merced to Carlucci Road connecting Merced to the Bay Area.

The Authority will advance station area development, which will include the release of a station design contract for the Fresno Station. In addition, the Authority will begin planning efforts related to an initial stop at Madera to connect with Amtrak San Joaquin services as part of beginning service on the Silicon Valley to Central Valley Line.

Fresno to Bakersfield

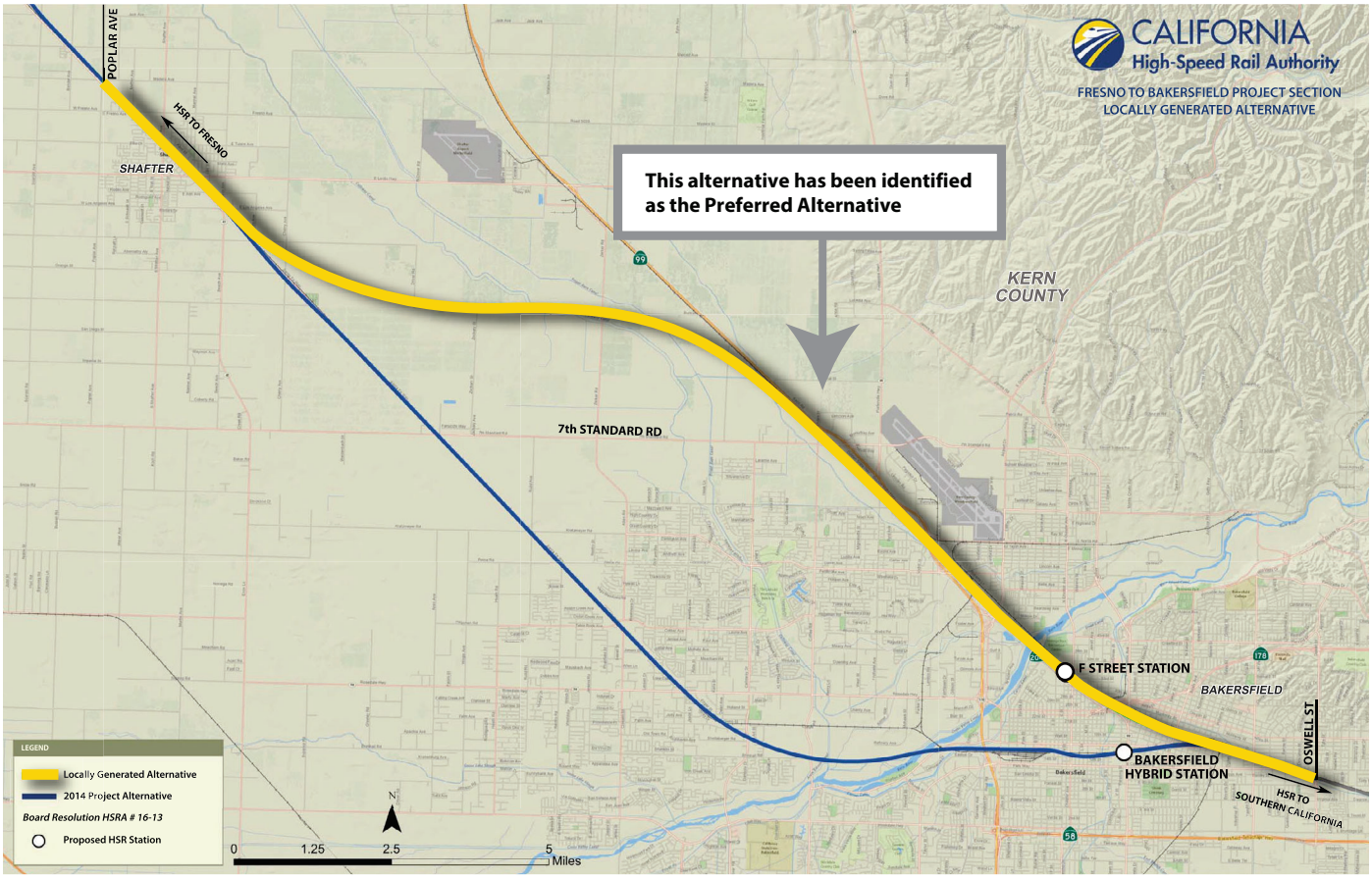
In May 2014, the Board of Directors certified a Final EIR/EIS for the Fresno to Bakersfield project section. The document identified a preferred alignment from the Fresno Station to the Bakersfield Station located at Truxtun Avenue. In June 2014, the City of Bakersfield filed a lawsuit challenging the approval under the California Environmental Quality Act (CEQA). As a result, the Authority and the City of Bakersfield continued meeting in an effort to resolve the issues addressed by the litigation. In December 2014, the Authority and the City of Bakersfield announced that they would study an alternative alignment, known as the Locally Generated Alternative, that includes a high-speed rail station at F Street and that the City agreed to dismiss its CEQA lawsuit.

The Authority has continued outreach and collaboration with local communities and stakeholders to inform and involve the people of these communities through the next steps of the process in delivering high-speed rail.

In May 2016, the Authority Board of Directors concurred with the staff's recommendation to identify the Locally Generated Alternative and the F Street Station as the preferred alternative in the Fresno to Bakersfield Project Section Supplemental EIR/EIS. Collaboration and communication is also continuing with the city of Shafter and with Kern County regarding high-speed rail in the region.

In addition, several station area planning agreements were executed over the last two years. Agreements were executed with Tulare County Association of Governments (TCAG) and the city of Bakersfield to begin development of station-area plans. Both have hired consultants to support this planning and have begun work on alternative development scenarios around each station. TCAG is focused on looking at connectivity from the surrounding cities to the Kings/Tulare station. Bakersfield has shared three alternative concepts with the community and is refining those concepts based upon public input.

An agreement was also executed with the city of Wasco in May 2016 to address environmental issues related to project impacts to farmworker housing along the high-speed rail alignment near the Wasco Amtrak station. The Authority will contribute $10 million to support city efforts to relocate the housing within the city.



Next Steps: The Fresno to Bakersfield Locally Generated Alternative Draft Supplemental EIR/EIS is expected to be released for public review and comment in spring 2017. The Authority will work with the community, stakeholders and environmental justice communities to gather comments on the draft environmental document. A final document is anticipated to be released in early 2018. During this time, the agency will work with the cities of Shafter and Bakersfield to identify additional funding to potentially continue construction of the Silicon Valley to Central Valley Line from Poplar Street in Shafter to Bakersfield as outlined in the 2016 Business Plan.

In addition, station area planning work will continue with the TCAG on transportation access to the high-speed rail station near Hanford, and station design is expected to begin soon after completion. The development of a regional connectivity plan will include evaluating transit-oriented development opportunities and how economic development may be spurred through enhanced access to surrounding communities. It will also assess the feasibility and timing of future transit investments such as Bus Rapid Transit and light-rail along the Cross Valley Rail Corridor.

Planning work is also expected to be completed for a station in the city of Bakersfield. The city of Bakersfield, in partnership with, and with funding from the Authority, is developing a high-speed rail station area plan for downtown Bakersfield. The study area includes the approximate boundaries of the Kern River and 38th Street to the north, California Avenue to the south, Union Avenue to the east, and F Street to the west. This effort will identify and analyze opportunities and challenges in the area in order to develop an urban design, multi-modal transportation and economic development strategy that optimizes future growth in the area. When complete, the plan will serve as a vision document that will guide the future development of the station area. This is being done in preparation for station design when additional funding is identified to continue the Silicon Valley to Central Valley Line.

SOUTHERN CALIFORNIA

The Southern California portion of the high-speed rail system includes four Phase 1 project sections: Bakersfield to Palmdale, Palmdale to Burbank, Burbank to Los Angeles, and Los Angeles to Anaheim. Through community and stakeholder outreach, the Authority has advanced the environmental review process for all four project sections and is moving toward identification of preferred alternatives and the release of Draft EIR/EIS as outlined in the Schedule Section of this report. For each of the four project sections, the selection of a preferred alternative will come after years of technical analysis and public engagement. Each of these sections has unique circumstances, including several that are part of the nation's second busiest passenger rail corridor and are also vital for freight and goods movement. Combined, the

High-Speed Rail Funding Dedicated to Southern California Early Investments and Connectivity

Nearly $1 billion in Proposition 1A funding has been dedicated towards early investments to advance statewide rail modernization. This includes nearly $400 million dedicated to connectivity projects that support safety and modernization improvements, including positive train control, upgraded vehicles and rail corridor upgrades. In addition, $500 million was set aside and memorialized in a Southern California Memorandum of Understanding executed in 2012 to support improvement projects in the Phase 1 system. Projects include:

- Link Union Station
- Rosecrans/Marquardt Grade Separation
- Doran Street and Broadway/Brazil Grade Separation
- State College Grade Separation
- Fullerton Junction

These investments are being made as part of an overall State of California rail modernization program, which is also dedicating Greenhouse Gas Reduction Funds, as well as other discretionary state funding towards improvements statewide. This includes funding through the Transit and Intercity Rail Capital Program, which is funding 14 projects in Southern California for a total of $386.3 million and various projects funded through Proposition 1B as well as California Public Utilities Commission funding.

Burbank to Los Angeles and the Los Angeles to Anaheim sections make this a vital corridor to both the regional and state economies.

Active and continued public engagement, as well as technical analysis in all four project sections, remains an essential part of the Authority's process as it works toward the environmental milestones. Additionally, while the environmental process moves forward, the Authority is collaborating with regional transportation partners to identify, fund and develop early investments in local and regional rail lines that will improve and enhance this corridor and provide early benefits to Southern California communities even before high-speed rail service begins as discussed earlier in this report.

Bakersfield to Palmdale

The Bakersfield to Palmdale project section is part of the first phase of the high-speed rail system and will connect the Central Valley to the Antelope Valley, closing the existing passenger rail gap between Northern and Southern California over the Tehachapi Mountains. The approximately 80-mile project section will travel through or near the cities of Edison, Tehachapi, Rosamond, Lancaster and Palmdale with stations in Bakersfield and at the Palmdale Transportation Center.

The Authority completed a Supplemental Alternatives Analysis in April 2016, identifying four alignment alternatives (Alternatives 1, 2, 3 and 5) to carry forward for further analysis. The alignment alternatives address comments from government agencies, the public, employers, land owners, and local and regional governments. The alignments avoid or minimize potential impacts to existing facilities, land uses, and environmental resources. All four alternatives are being fully evaluated in the Draft EIR/EIS for this section. Preliminary geotechnical drilling, and a substantial amount of environmental field work and data gathering was completed in 2016.

Extensive public outreach in this project section has been conducted over the past two years and continues through 2017. In the most recent public engagement events earlier this year, the Authority hosted six community open houses. Correspondingly, agency and stakeholder working group meetings held in 2015 and 2016 included representation from more than 35 organizations. During the course of the outreach, the Authority has met with numerous federal, state and local entities, including the U.S. Department of Defense, Bureau of Land Management, Kern County, the community of Rosamond, and the cities of Tehachapi, Lancaster and Palmdale, local farm bureaus, and land and business owners along the alignments. Coordination with key resources agencies including the U.S. Army Corp of Engineers, and the U.S. Fish & Wildlife Service was also conducted during this time.

Next Steps: Environmental and technical analysis will continue with a staff recommended preferred alternative expected in summer 2017 and the release of a Draft EIR/EIS towards the end of the year. Public outreach and open houses will continue before, during and after the circulation of this document. Work with corridor stakeholders will identify where high-speed rail plans and local plans overlap. This will ensure that high-speed rail investments incorporate regional state of good repair and improvements, where a nexus exists, in high-speed rail environmental clearances and future planning activities.

As funding is available, the Authority will develop procurement documents and move forward on right-of-way acquisition and construction.

Palmdale to Burbank

The Palmdale to Burbank project section is part of the first phase of the high-speed rail system connecting the Antelope Valley to the San Fernando Valley to bring high-speed rail service to the urban Los Angeles area. The approximately 40-mile project section will connect stations at the Palmdale Transportation Center to a new high-speed rail station at the Hollywood Burbank Airport. The corridor travels through extremely diverse areas from rural and mountainous to suburban and dense urban environments.

The Authority completed a Supplemental Alternatives Analysis (SAA) in April 2016, identifying three alignment alternatives (SR 14, E1 and E2) to be carried forward for further analysis. After careful analysis and review with communities, these three alignment alternatives incorporated refinements that further avoid or minimize potential impacts to the existing communities, facilities, land uses, and environmental resources, while improving future high-speed rail operations and constructability. The three alignment alternatives identified in the SAA will be fully analyzed in the Draft EIR/EIS.

Since 2014, four rounds of public open house community meetings were held with more than 3,500 attendees. Additionally, multiple working group meetings with nearly 500 participants, and more than 200 community meetings, presentations or briefings took place. These efforts have included a multi-faceted, multi-lingual approach focused on reaching all affected communities in the area to involve them in the decision making process.

In addition, the Authority has worked with multiple federal, state, county and local agencies, including the U.S. Forest Service for geotechnical work that was conducted in the Angeles National Forest. This work included investigating rock quality and tunnel depth, as well as optimizing tunnel alignments while minimizing impacts.

The Authority has also established multiple agreements with local and regional transportation partners to improve the existing transportation network. For example, in January 2016, the Authority entered into separate station area planning agreements with the cities of Palmdale and Burbank to begin the planning process to develop world class multimodal transportation hubs. The Palmdale agreement incorporates the proposed high-speed rail station at the Palmdale Transportation Center and the Palmdale Civic Center area.

Geotechnical Investigation in the Angeles National Forest

In 2016, geotechnical investigations were initiated to analyze and minimize impacts to the Angeles National Forest for the alignment alternatives being considered between Palmdale and Burbank.The purpose of these investigations was to:

- Evaluate rock quality at the depth of the tunnels and characterize it for a tunnel boring machine
- Characterize bedrock faults and evaluate groundwater
- Optimize the tunnel alignment through Angeles National Forest with the objective of minimizing potential impacts

The scope of the geotechnical investigations included:

- Completing 6 exploratory core holes from 1,000 – 2,700 feet deep
- Measuring water pressures, rock stresses and hydraulic conductivities
- Conduct core hole geophysical surveys
- Sample groundwater and analyze water chemistry
- Install instrumentation for a laboratory testing program

A video with more information about these investigations is available at:
www.youtube.com/watch?v=J_zK3xkxwZg

Engineer Alvaro Relano explains refined alignments in the Palmdale to Burbank Project Section to community members at the Acton/Agua Dulce Open House meeting in September 2016.

The Burbank agreement incorporates the proposed high-speed rail station, the Regional Intermodal Transportation Center (RITC), Amtrak and Metrolink Stations, bus services, ride share, and active transportation all adjacent to the Hollywood Burbank Airport.

Next Steps: Environmental and technical analysis will continue with a staff recommended preferred alternative expected in fall 2017 and the release of a Draft EIR/EIS towards the end of the year. Outreach, including open house community meetings, will continue to further engage local jurisdictions, environmental justice populations, regulatory agencies, and other stakeholders. Environmental clearance efforts will conclude in 2018 and the Authority will identify early next steps, including development of procurement documents and right of way acquisition in order to move into construction as funding is available. The Authority continues to work with corridor stakeholders to identify where high-speed rail plans and local plans overlap. To the extent possible, given a nexus with future high-speed rail improvements, the Authority will ensure that regional state of good repair and other improvements are discussed in environmental clearance and future planning activities.

The City of Palmdale will continue station area planning related to land use changes around the proposed station area and will complete these efforts in 2017. Related to this effort, coordination will continue with the city, developers and the community to ensure that the station is integrated with future development plans for the area.

Burbank to Los Angeles

The Burbank to Los Angeles project section is part of the first phase of the high-speed rail system connecting two key multi-modal transportation hubs, the Hollywood Burbank Airport and Los Angeles Union Station (LAUS), providing an additional link between Downtown Los Angeles, the San Fernando Valley and the state. The approximately 12-mile project section proposes to utilize the existing railroad right-of-way to the extent possible, adjacent to the Los Angeles River, through the cities of Burbank, Glendale and Los Angeles.

This project section is of regional and statewide significance and is essential to the economy of Southern California. In addition to moving people, it is a vital for freight and goods movement. While the ongoing environmental analysis is happening in this project section, early investments are being made and focus on grade separations. These early benefits for this congested corridor will increase capacity, as well as improve safety and air quality in a disadvantaged community.

In this project section, existing Amtrak/Metrolink stations in downtown Burbank and in Glendale will remain. The two electrified tracks needed for high-speed rail will share the current rail corridor utilized by Amtrak, Metrolink and freight railroads. This enhanced corridor, with additional tracks, will improve operations for both existing passenger rail services and freight rail, and will enhance safety at six current grade crossings with roads that will be fully grade-separated (over or under a railway to eliminate

hazards). Improvements will also consider the future needs of the corridor and identify opportunities for joint use of tracks in select locations.

The Authority completed the Supplemental Alternatives Analysis (SAA) for the Burbank to Los Angeles project section in April 2016. As part of the development of the SAA, an updated alternative was recommended with design variations and options at specific locations. The alignment has been further refined with respect to street and rail crossings that will need to be modified.

The Authority is working closely with project partners to improve and refine the proposed alternative. Public meetings were held throughout 2014 and 2015, informing hundreds of community members about the Burbank to Los Angeles project section. This includes scoping meetings in 2014 and a round of three community open houses in the fall of 2015 to receive feedback on the alignment. Most recently, the Authority hosted public outreach meetings in late 2016. This outreach including working group meetings, stakeholder meetings, and community open house meetings.

Starting in 2015, a robust Stakeholder Working Group representing a wide-range of community organizations has met three times and provides valuable insight at key project milestones. Focused outreach has been conducted to ensure community participation, with 180 community briefings and presentations completed since 2014.

Next Steps: Environmental and technical analysis will continue with a staff recommended preferred alternative expected in summer 2017 and the release of a Draft EIR/EIS in late summer. Extensive public and stakeholder outreach will continue focusing on community discussions around proposed grade separations and continued outreach to environmental justice populations.

The City of Burbank will complete station area planning work related to land use changes around the proposed station area. Related to this effort, coordination will continue with the city, Hollywood Burbank Airport, developers and the community to ensure that the station is integrated with future development plans for the area.

The Authority will continue to work with LA Metro on planning and design at and around Los Angeles Union Station, including the Link Union Station Project, which will integrate high-speed rail into the historic station while providing for improved regional rail operations and passenger experience for all users of this important station. This is part of a broader regional undertaking with other major transit operators to plan for how all services operating at the station will be integrated. It is designed to increase rail capacity, improve access and connectivity, improve air quality and modernize the passenger concourse area.

Additionally, the Authority will continue to work with rail corridor owners and operators to further define a safe, modern, urban corridor that will allow for blended passenger and freight operations and advance opportunities for early investment projects to deliver

Members of the public attended an open house community meeting in 2016 in the Burbank to Los Angeles project section. At the meeting, they viewed potential alignments and learned more about the project.

immediate benefits to existing users, as well as define next steps for high-speed rail implementation following environmental clearance. The Authority continues to work with corridor stakeholders to identify where high-speed rail plans and local plans overlap. This will multiply the benefits of the high-speed rail investment by incorporating regional state of good repair and other improvements in high-speed rail environmental clearances and future planning efforts where there is a nexus with high-speed rail investment.

Los Angeles to Anaheim

The Los Angeles to Anaheim project section connects Los Angeles and Orange counties by traveling from Los Angeles Union Station (LAUS) to the Anaheim Regional Transportation Intermodal Center (ARTIC) using the existing Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor. The approximately 30-mile corridor travels through the cities of Los Angeles, Vernon, Commerce, Bell, Montebello, Pico Rivera, Norwalk, Santa Fe Springs, La Mirada, Buena Park, Fullerton and Anaheim.

Similar to investments in the north, improvements in this section will involve sharing tracks with other providers in the rail corridor, which will result in blended passenger operations with existing passenger and freight rail systems. The corridor will be augmented with additional tracks that will improve overall passenger and freight rail operations, increase capacity, and improve the speed, safety and efficiency of existing passenger and freight services. The investments in this corridor will enhance safety at current grade crossings with roads that are grade-separated.

The Authority completed a Supplemental Alternatives Analysis in April 2016, analyzing two build alternatives. Alternative 2 would have fewer right of way impacts, have lower capital costs, have less impacts on parks, trails and bikeways, schools, historic architectural resources, and generally have less impacts on wildlife, waters and wetlands, and would also satisfy the needs of the shared use corridor. As such, Alternative 2 will be fully analyzed in the Draft EIR/EIS.

The Authority is working closely with project partners, including the individual corridor cities, the Gateway Cities Council of Governments, Metro, the Orange County Transportation Authority, LOSSAN Joint Powers Authority and others in order to improve and refine the proposed alternative. In October 2015, the Authority hosted a series of public meetings with more than 200 in-person and online participants. Current outreach activities include a robust Stakeholder Working Group representing a wide-range of community organizations, and focused outreach within the adjacent communities.

In 2016, the Authority committed early investment bookend funds appropriated in 2012 by Senate Bill 1029 for the Rosecrans/Marquardt Grade Separation Project – the highest-priority rail grade separation project in the state as rated by the California Public Utilities Commission, which is located in this project section. This critical grade separation will provide immediate operational and safety benefits that will be shared by Metrolink, BNSF, and Amtrak passenger rail services (and eventually high-speed rail), as well as improve the local traffic in the area.

Next Steps: Environmental and technical analysis will continue with a staff recommended preferred alternative expected in summer 2017 and the release of a Draft EIR/EIS in the fall. The Authority will continue outreach to the public and stakeholders over the coming year, including open house community meetings and focused outreach at proposed grade separations.

The Authority will continue to work with rail corridor owners and operators to develop the safe, modern, urban corridor that will allow for blended operations with other passenger and freight providers to allow for maximum use of this constrained corridor. This shared use approach multiplies the benefits of high-speed rail by providing safety, air quality and state of good repair benefits to the existing rail corridor.

Also, the Authority will advance opportunities for early investment projects to deliver immediate benefits, as well as define next steps for high-speed rail implementation following environmental clearance. To the extent there is a nexus with the high-speed rail program, the Authority will incorporate regional state of good repair and other improvements in the high-speed rail environmental clearance and future planning activities.

PHASE 2

Los Angeles to San Diego (Via the Inland Empire)

The Authority meets every other month and/or as needed with regional transportation partners from the four-county Southern California Inland Corridor Group (ICG) to coordinate the high-speed rail program with regional land use planning and transportation plans. The Inland Corridor Group has been essential in fostering integrated regional planning in order to promote synergy among the many systems and agencies along the 170 mile Los Angeles to San Diego alignment. With input from the Inland Corridor Group, advancement of conceptual engineering and preliminary environmental review activities continue as the Authority addresses stakeholder feedback received on the alignments presented in the Preliminary Alternatives Analysis Report. A draft alignment refinement report has been developed and continues to be updated to reflect the most recent coordination efforts. The Authority will document these efforts and present its findings and recommendations in a Supplemental Alternatives Analysis Report.

In conjunction with corridor definition efforts, the Authority and the Inland Corridor Group partners have embarked on the development of a technical planning study that will present strategies for how high-speed rail will be implemented in the project section. This includes prioritizing locations for advancing enhanced connections to the Phase 1 system, opportunities for right of way preservation, strategies for environmental clearance, and opportunities for partnerships and shared funding to move high-speed rail forward.

Stakeholder Working Group members, comprised of community leaders and service providers from across various sectors serving the community, discuss desired project objectives for the Los Angeles to Anaheim project section. They included improving mobility, the environment, the economy, community livability, and other participant specified objectives.

The planning document and process will identify opportunities in the region that provide for improved connectivity from the Inland Empire and San Diego to the Phase 1 high-speed rail system and across the region, while also accommodating the

future Phase 2 high-speed rail corridor. Additional alignment refinements and planning in key areas such as Ontario International Airport and San Diego International Airport inform local investments that are already occurring and provide input to future, regional and state projects that improve mobility and provide connectivity.

Concurrently, other agencies are advancing planning efforts that will support and enhance the Southern California passenger rail network, including the 2018 California State Rail Plan. The Los Angeles to San Diego planning work is being performed collaboratively with these efforts. Upon completion, it will reflect these plans and inform other ongoing studies.

Next Steps: The Authority will continue to advance corridor planning and project definition. The project team will work with the Inland Corridor Group to complete the technical planning study for high-speed rail as part of the regional rail network and will move towards producing a Supplemental Alternatives Analysis. The Authority will also coordinate with local agencies to identify opportunities for concurrent investments that will provide immediate benefits and could facilitate future high-speed rail.

Merced to Sacramento

As part of its efforts to integrate the high-speed rail system into the state's overall passenger rail network, the Authority continues to work with the Northern California Rail Partners to identify and prioritize near-term regional rail improvements as part of the Northern California Unified Rail Service and for the 2018 California State Rail Plan work. Stakeholder engagement and coordinating with nearly 30 public agencies, including congressional, state, regional, and local governments planning for the Merced to Sacramento project section.

The purposes of the Authority's stakeholder outreach are to inform and engage stakeholders in the Merced to Sacramento area of planning efforts, identify tradeoffs between near term and long term investments, and gain valuable feedback from the community and technical service providers.

As part of this collaborative effort, we are coordinating with affected rail providers and considering transportation service connections to the Bay Area and south to Fresno and Bakersfield. The planning efforts consist of an assessment of the opportunities and constraints for better, faster, more frequent and more coordinated passenger rail service from Merced to Sacramento. The study will include options for conceptual phasing and will develop prioritization for service goals and the associated infrastructure requirements that support those goals. This high level prioritization will provide the framework for future investments that meet the service goals that will ultimately lead to the development of a phased capital program.

With construction of the high-speed rail backbone underway in the Central Valley, we are working to assess other locally planned improvements that increase connectivity and enhance the network. The Authority will continue to work with our partners to explore upgrades to the San Joaquin, Altamont

and Capitol Corridor passenger rail lines to improve service frequency, reduce travel times, and provide connectivity to the future high-speed rail system.

Planning in this corridor focuses on connectivity improvements in anticipation of future high-speed rail service. Staff works closely with local partners and collaborates with the California State Transportation Agency and Caltrans on the 2018 State Rail Plan, which will advance additional efforts to develop a seamless statewide rail network.

The Authority is committed to pursuing Merced to Sacramento and Altamont Corridor planning efforts, as addressed through spending appropriations for these corridor segments as identified in SB 1029. There are two SB 1029 connectivity projects located in this section:

- Sacramento Intermodal Facility High-Speed - $600,000
- Stockton Passenger Track Extension - $6 million

The Sacramento project is nearing completion and the Stockton project has just completed contract negotiations with Union Pacific Railroad and will be progressing to project completion in June 2018.

Next Steps: The Authority will continue to coordinate with partner agencies on the investments through SB 1029 and will stay engaged in planning efforts and stakeholder outreach to receive input on mobility improvements and setting project priorities.

3. Financials

BASELINES, CURRENT AND PROJECTED BUDGETS AND EXPENDITURES TO DATE

The 2016 Business Plan presented a comprehensive update of the cost estimates for the Phase 1 system as it was defined in Proposition 1A -- San Francisco/Merced to Los Angeles/Anaheim. Notably, it also laid out a new implementation strategy for delivering the Phase 1 system. Specifically, the 2016 Business Plan identified the Silicon Valley to Central Valley Line as the initial operating line for passenger rail service. This implementation strategy represents a change from the 2012 and 2014 Business Plans and the most recent 2015 Project Update Report. In prior business plans and project update reports, the Authority identified a three-stage plan for completing the Phase 1 system: Initial Operating Section (Merced to San Fernando Valley); Bay to Basin (San Jose to San Fernando Valley); Phase 1 (San Francisco to Los Angeles/Anaheim). However, the long-term commitment of Cap and Trade proceeds by the Legislature and the Governor (Senate Bill 862) influenced the program's strategic direction, positioning the Authority to shift to an implementation strategy to deliver an initial operating line using available funds in 2025.

SB 1029 PROJECT UPDATE REPORT

Section (b)
The baseline budget for all project phase costs, by segment or contract, beginning with the California High-Speed Rail Program Revised 2012 Business Plan.

Section (c)
The current and projected budget, by segment or contract, for all project phase costs.

Section (d)
Expenditures to date, by segment or contract, for all project phase costs.

PRE-CONSTRUCTION PHASE

Pre-construction expenditures are defined in California Streets and Highways Code Section 2704.08(g) as, "environmental studies, planning, and preliminary engineering activities, and for (1) acquisition of interests in real property and right of way and improvement thereof (A) for preservation for high-speed rail uses, (B) to add to third-party improvements to make them compatible with high-speed rail uses, or (C) to avoid or to mitigate incompatible improvements or uses; (2) mitigation of any direct or indirect environmental impacts resulting from the foregoing; and (3) relocation assistance for property owners and occupants who are displaced as a result of the foregoing."

It is important to note, that the overall Phase 1 Project Development budget represents approximately 1.6 percent of the overall $64.2 billion Phase 1 program capital cost. This cost is low when compared with national trends (TCRP and other experience) which show that these costs can range from 2.5 to 6 percent of total project costs.

Table 3.0 shows the current pre-construction contracts by implementation phase (Phase 1, Phase 2 and Program-wide). Each contract provides a summary of the original contract value, contract start and end dates, expenditures through December 2016, and projected costs at completion. The Authority's initial contracts were awarded between 2006 and 2008; during that timeframe it was assumed that the environmental reviews for all of the Phase 1 sections would be complete by 2014 and Phase 1 of the high-speed rail would be implemented and operational by 2020. All but one of these contracts have expired; the one that still is in effect is for completing the supplemental environmental document for the Central Valley Wye section of the Merced to Fresno project section. The projected completion of all

Phase 1 environmental clearance has been updated so that the preferred alternatives are targeted to be identified and draft environmental documents will be issued by or before the end of 2017 with final environmental clearance in 2018. As shown on Table 3.0 , three contracts were originally issued as single contracts for larger environmental sections but were subsequently divided as follows:

- Initially, a contract was issued for the Sacramento to Fresno project section; it was subsequently divided into two project sections – the Merced to Fresno and the Merced to Sacramento project sections with both remaining under contract to AECOM. Subsequently, the Merced to Fresno environmental document was completed and a contract with Precision Engineering was procured in May 2014 to continue Phase 2 planning in the Merced to Sacramento section. The Precision work was completed and the contract has expired.

- Similarly, subsequent to issuing a contract for the Fresno to Palmdale project section; it was divided into two project sections – the Fresno to Bakersfield and Bakersfield to Palmdale project sections with both remaining under contract to the URS-HMM-Arup/JV. Subsequently, the Fresno to Bakersfield EIR/EIS was completed and the contract expired. Work related to Fresno to Bakersfield supplemental environmental work and the Bakersfield to Palmdale environmental work was re-procured and is now with T.Y.Lin.

- Originally, a contract was issued for a larger Palmdale to Los Angeles project section (under contract to HMM-URS-Arup/JV) which has now expired. That longer section was divided into two project sections and re-procured, with the Palmdale to Burbank project section with SENER and the Burbank to Los Angeles project section with STV.

- Since the 2015 Project Update Report, five regional sections have been re-procured: San Francisco to San Jose and San Jose to Merced (HNTB), Palmdale to Burbank (SENER), Burbank to Los Angeles (STV) and Los Angeles to Anaheim (STV). New contract durations were for a set period of time and all currently extend beyond the proposed record of decision milestone to allow for permitting and other post-environmental activities.

A number of program-wide contracts have also been procured or re-procured since 2015. Table 3 shows the Program Management Team Contract (Parsons Brinckerhoff) that was re-procured in 2015 as the Rail Delivery Partner (RDP) Contract (WSP | Parsons Brinckerhoff). The table also shows Agency Costs and other, which represents a number of contracts with state and federal agencies that support environmental, permitting and other aspects of program delivery such as the U.S. Army Corps of Engineers and the California Department of Fish and Wildlife. It also includes additional professional services contracts such as financial advisory, geotechnical and right of way services, among others.

The projected costs at completion shown in Table 3 reflect the current forecast (subject to change) to complete the pre-construction phase (as documented in the Authority/FRA grant funding contribution plan) plus all expenditures through December 2016. Program Management and Agency Costs cover both pre-construction and construction phases. The Authority prepares comprehensive updates on all pre-construction contracts and presents them to the Board of Directors' Finance and Audit Committee for review on a monthly basis. Table 3.0 summarizes information from the Finance and Audit Committee

TABLE 3.0 PRE-CONSTRUCTION PHASE BUDGETS BY CONTRACT AS OF 12/31/16 (DOLLARS IN MILLIONS)

	Section	Contract Start	Board Authorization for Amendment	Current Contract Completion	Current Contract Value	Projected Cost at Complete	Expenditures Thru December 2016
PHASE I	San Francisco - San Jose (HNTB)	7 Feb	N/A	Completed	--	$45	$45
	San Francisco – San Jose and San Jose - Merced (HNTB)	15 Nov	15 Nov	18 Nov	$36	$36	$15
	San Jose - Merced (Parsons Transportation Group)	8 Dec	N/A	Completed	--	$45	$45
	Merced – Fresno Central Valley Wye (Parsons Transportation Group)	8 Dec	14 Jun	18 Jun	$77	$77	$72
	Merced - Fresno (AECOM)	7 Feb	13 May	Completed	--	$50	$50
	Fresno Bakersfield (URS-HMM-Arup/JV)	7 Feb	13 Apr	Completed	--	$118	$118
	Bakersfield- Palmdale (URS-HMM-Arup/JV)	7 Feb	N/A	Completed	--	$26	$26
	Fresno – Bakersfield Locally Generated Alternative (T.Y.Lin)	14 Feb	16 Oct	19 Jan	$22	$22	$4
	Bakersfield - Palmdale (T.Y.Lin)	14 Feb	13 Nov	19 Nov	$46	$46	$36
	Palmdale - Los Angeles (HMM-URS-Arup/JV)	6 Dec	14 Jun	Completed	--	$74	$74
	Palmdale - Burbank (Sener)	15 Apr	15 Mar	20 Apr	$56	$56	$30
	Burbank - Los Angeles (STV)	15 Feb	14 Apr	20 Jan	$21	$21	$4
	Los Angeles - Anaheim (STV)	6 Dec	N/A	Completed	--	$50	$50
	Los Angeles - Anaheim (STV)	15 Feb	14 Apr	20 Jan	$30	$30	$16
PHASE II	Los Angeles - San Diego (HNTB)	7 Feb	N/A	Completed	--	$12	$12
	Los Angeles - San Diego (CH2M Hill)	14 Feb	13 Oct	18 Jan	$5	$5	$3
	Merced -Sacramento (AECOM)	7 Feb	13 May	Completed	--	$8	$8
	Merced - Sacramento (Precision Civil Engineering)	14 May	13 Aug	Completed	--	$1	$1
	Altamont (AECOM) (Under SJRRC direction)	8 Nov	14 Apr	19 Jun	$55	$23	$18
PROGRAM-WIDE	Agency Costs & Other (Estimate)	N/A	N/A	N/A	--	$292	$57
	Program Management[1] (Parsons Brinckerhoff)	6 Nov	13 May	Completed	--	$256	$256
	Rail Delivery Partner (Parsons Brinckerhoff)	15 Jul	15 Jun	22 Jun	$700	$700	$119
	TOTAL				**$1,048**	**$1,993[2]**	**$1,059**

1 - Program management costs include pre-construction and construction cost.
2 - Includes pre-construction and construction costs as outlined in February 2017 Capital Outlay Summary Report.

February Contracts & Expenditures and Capital Outlay reports and represents data through December 31, 2016. These reports can be found on the Authority's website at: ***www.hsr.ca.gov/Board/monthly_fa_committee_meeting.html***

Table 3.1 shows the breakdown of costs for the four Central Valley construction contracts that have been executed to date: the three design-build construction packages and the State Route 99 (SR 99) Realignment Project inter-agency agreement executed with the California Department of Transportation (Caltrans). The contract execution date, contract value, contingency and expenditures to date as of December 31, 2016 are summarized. Contingency amounts for each contract are based on the Authority risk-informed assessment reports, recommended contingency estimates and the unit price allowance for hazardous soil remediation. These are approved separately by the Authority's Board of Directors after contracts are awarded. In addition to the allocated contingencies for each contract, the Authority also maintains an unallocated contingency to address unknown conditions.

- Tutor Perini/Zachry/Parsons (TPZP) was awarded the contract for Construction Package 1 in 2013 at a contract price of $970 million with additional Authority-controlled provisional sums of $53 million for utility relocation, construction contract work and unforeseen circumstances, such as the discovery of hazardous materials. A $160 million contingency was approved by the Authority's Board of Directors in September 2013. This contract was amended in 2016 to include a nearly 3-mile extension to Madera and various change orders, including extending the contract completion date, for a total of $400 million.

- In 2013, the Authority decided to utilize the California Department of Transportation (Caltrans) to manage a 2.5-mile realignment of State Route 99 in Fresno to create space for high-speed rail between the Union Pacific Railroad line and State Route 99[4]. The original inter-agency agreement was $226 million with $9 million contingency approved by the Authority Board of Directors. A change order was executed in early 2017 increasing the contract value by $35 million to a total of $261 million for increased costs associated with utilities and railroad agreements that were not fully known in 2013.

- Dragados/Flatiron Joint Venture (DFJV) was awarded the contract for Construction Package 2-3 in January 2015. The contract price is $1,205 billion with additional Authority-controlled provisional sums of $160 million in April 2016. The Board of Directors also approved $261 million in contingency.

- California Rail Builders (CRB) was awarded the contract for Construction Package 4 in January 2016. The contract price is $337 million with additional Authority-controlled provisional sums of $107 million, including $62 million in contingency approved by the Board in April 2016.

Detailed updates on the status of these construction contracts is reported in the Finance and Audit Committee's monthly status reports, which are organized by construction package. The Authority has established a Change Control Committee responsible for the review of project-level (change orders) and Program-level (configuration) changes. The committee provides feedback, concurrence, or recommendations for actions to be taken once a full evaluation of the facts and affects to the program are

TABLE 3.1 CONSTRUCTION PHASE BUDGETS BY CONTRACT AS OF 12/31/16[3]

Contract	Contract Execution Date	Original Contract Value	Original Contract Value + Provisional Sums	Approved Change Orders	Current Contract Value	Board of Directors Approved Contingency	Current Contingency Balance	Expenditures to Date
DB Services for CP 1 (Tutor Perini/ Zachry/ Parsons)	8/16/2013	$970	$1,023	$400[1]	$1,423	$160	$72	$455
Construction Services for SR99 (Caltrans)	2/19/2013	$226	$226	$0	$226[2]	$9	$8	$123
DB Services for CP 2-3 (Dragados/ Flatiron)	6/10/2015	$1,205	$1,365	$7	$1,372	$261	$254	$279
DB Services for CP 4 (California Rail Builders)	2/29/2016	$337	$444	$2	$446	$62	$60	$41

1 - The executed change order amount of $400 million includes $153 million for the Madera Extension, $159 million for excluded third party budget ($112 million for future costs and $47 million for executed change orders), and $88 million for various change orders from contingency.
2 - February 2017 Board action increased SR99 contract by $35 million, which will be reflected in subsequent reports.
3 - Source of data - February 2017 Monthly Status Reports: ***www.hsr.ca.gov/Board/monthly_fa_committee_meeting.html***
Expenditures to date are based on approved invoices.

understood. Recommendations are then forwarded for decision making by the Board of Directors, Chief Executive Officer or the Authority delegated managers as defined in the Delegated Authority policy.

CAPITAL COST ESTIMATES

The Authority prepared a comprehensive update of its capital cost estimates in the 2016 Business Plan, factoring in the lessons learned from the first design-build construction bids, design refinements suggested in those proposals and through other reviews, advancing preliminary engineering for environmental clearance, conducting value engineering, incorporating contractors' viewpoints and other changes. Through this process, the overall Phase 1 cost estimate was reduced. For the same scope of work as reflected in the 2014 Business Plan and the 2015 Project Update Report, the updated estimates reflected an eight percent reduction in costs, down to $62.1 billion in year of expenditure dollars (YOE$) when compared to the $67.6 billion estimate presented in the 2014 Business Plan.

At the same time, the Authority enhanced the scope for the Los Angeles to Anaheim project section as part of the updated 2016 Business Plan. Specifically, a $2.1 billion investment in that corridor is now planned, which fulfills the commitment made in the 2012 and 2014 Business Plans to provide one-seat ride service all the way to Anaheim. This additional investment will enhance capacity, speed, safety and reliability in this heavily-traveled corridor. After adding in the higher level of investment for the corridor to Anaheim, the cost estimate for the Phase 1 system was still reduced from $67.6 billion to $64.2 billion (YOE$), which is the Authority's current revised Phase 1 system capital cost estimate.

The cost estimates presented in Table 3.2 show the updated Phase 1 cost estimates for each project section. The updated costs are presented in both base year 2015 dollars and in YOE dollars. The cost estimates are presented differently from the way they were shown in the 2015 Project Update Report, specifically:

- The previous 2015 report allocated approximately $8 billion in system wide costs across each of the project sections. These system costs included approximately $4.4 billion for high-speed rail trains (vehicles), $1.5 billion for program, project and construction management costs, and $2.3 billion in unallocated contingency funds.

- In the 2016 Business Plan, costs for high-speed rail trains and maintenance facilities have been separated as independent cost categories and the estimates have been updated. This more accurately reflects the system's operational requirements as opposed to being a function of an individual segment length. Because of that, in this 2017 Project Update Report, the costs of trains and maintenance facilities have been subtracted from the project section costs and are shown separately. Program, project and construction management costs, as well as unallocated contingency, continue to be allocated across project sections.

It is important to note that when comparing estimates over time there are many variables to take into account. A variety of factors have caused the estimates to change, including refined designs, lessons learned, recent bids and the fact that the train and maintenance facility costs have now been subtracted from project section costs, as discussed above.

In addition, the 2012 and 2014 Business Plans assumed a different phasing plan than the implementation strategy laid out in the 2016 Business Plan; specifically, prior plans identified Merced to San Fernando Valley as the initial line for revenue service, but the 2016 Business Plan now identifies the Silicon Valley to Central Valley Line as the initial line for service. This change in sequencing and timing affects the calculation of the year of expenditure costs.

The costs in the Merced-Fresno and Fresno-Bakersfield sections in Table 3.2 includes program scope that goes beyond the Silicon Valley to Central Valley Line described in the 2016 Business Plan and the Central Valley Usable Segment identified in the Funding Plan from January 2017. Costs for trainsets are for the full Phase 1 system inclusive of the trainsets that will be purchased for the initial Silicon Valley to Central Valley Line.

A detailed report on the updated construction cost estimates, how they were prepared, and how the cost estimates have changed and why, is available in the Capital Cost Basis of Estimate Report that was prepared as a technical supporting document to the 2016 Business Plan: ***www.hsr.ca.gov/docs/about/business_plans/2016_Business_Plan_Basis_of_Estimate.pdf***

TABLE 3.2 PHASE 1 CONSTRUCTION COST BY SECTION AS OF 12/31/16 (DOLLARS IN MILLIONS)

Baseline Budgets by Section		Cost Alignment Estimates (Constant Year Dollars[1])	Cost Alignment Estimate (YOE)
San Francisco - San Jose	2012 Business Plan	$5,699	$8,363
	2014 Business Plan	$5,813	$7,960
	2016 Business Plan	**$3,136**	**$3,501**
San Jose - Merced	2012 Business Plan	$14,042	$19,757
	2014 Business Plan	$14,332	$18,978
	2016 Business Plan	**$9,859**	**$11,171**
Merced - Fresno	2012 Business Plan	$5,214	$5,482
	2014 Business Plan	$5,392	$5,972
	2016 Business Plan	**$3,797**	**$4,270**
Fresno - Bakersfield	2012 Business Plan	$6,705	$7,711
	2014 Business Plan	$6,927	$7,813
	2016 Business Plan	**$8,317**	**$8,891**
Bakersfield - Palmdale	2012 Business Plan	$8,092	$9,533
	2014 Business Plan	$8,359	$9,418
	2016 Business Plan	**$9,746**	**$11,818**
Palmdale - Los Angeles	2012 Business Plan	$13,100	$16,704
	2014 Business Plan	$13,468	$16,627
	2016 Business Plan	**$13,470**	**$16,254**
Los Angeles - Anaheim	2012 Business Plan	$591	$815
	2014 Business Plan	$603	$825
	2016 Business Plan	**$2,329**	**$2,642**
Maintenance Facilities	**2016 Business Plan**	**$1,242**	**$1,499**
High-Speed Rail Trains (Trainsets)	**2016 Business Plan**	**$3,399**	**$4,192**
TOTAL	2012 Business Plan	$53,443	$68,365
	2014 Business Plan	$54,894	$67,593
	2016 Business Plan	**$55,295**	**$64,238**

1- For full explanation see Capital Costs Basis of Estimates Report in the 2016 Business Plan: ***www.hsr.ca.gov/docs/about/business_plans/2016_Business_Plan_Basis_of_Estimate.pdf***

4. Schedule

The 2016 Business Plan laid out an approach to sequencing the Phase 1 system that is based on three fundamental objectives:

1. **Initiate high-speed passenger rail service as soon as possible –** Based on this sequencing approach, the Silicon Valley to Central Valley Line was identified as the initial operating line that could be completed within existing identified funding services with passenger service starting in 2025.

2. **Make strategic, concurrent investments throughout the system that will be linked together over time –** This means making discrete investments that connect state, regional and local rail systems, which can provide early mobility, environmental, economic, safety and community benefits, as well as lay the foundation for high-speed rail. For example, $818 million of Authority and Proposition 1A funds are going to improvements in the Caltrain corridor and nearly $1 billion of Proposition 1A funds has been committed to early bookend and connectivity investments in Southern California, including the Rosecrans/Marquardt Grade Separation Project.

3. **Position the program to construct additional segments as funding become available –** Completing the required environmental analyses and securing environmental approvals as soon as possible for the entire system will position every mile of the system to be shovel ready as funding becomes available, with the goal of having the full Phase 1 system in operation by 2029.

SB 1029 PROJECT UPDATE REPORT

Section (e)

A comparison of the current and projected work schedule and the baseline schedule contained in the California High-Speed Rail Program Revised 2012 Business Plan.

The Authority establishes program and segment schedules based on a number of factors, and incorporates some contingency in anticipation of unforeseeable external factors. The schedules are based on the best available information and represent the Authority's plans and expectations. However, there are many factors that the Authority does not control that can affect the schedule, such as delays due to litigation, stakeholder and community consultations and actions required by other parties such as state and federal regulatory agencies. The Authority proactively monitors and seeks to mitigate these factors, particularly through its risk management program and its monthly Finance and Audit Committee reporting and review process.

ENVIRONMENTAL SCHEDULE

In the Central Valley, the Authority has completed some of the environmental documentation and received some approvals and certification under NEPA and CEQA for the 119 miles that is currently under construction through the Central Valley encompassing the Merced to Fresno and Fresno to Bakersfield project sections. Supplemental environmental documents are now being prepared to address specific issues related to these two project sections:

- Merced to Fresno Project Section: Central Valley Wye – A supplemental environmental document is being prepared to identify the alignment for the Central Valley Wye, a junction that will connect the Central Valley both to San Francisco and Sacramento to the north.

- Fresno to Bakersfield Project Section: Locally Generated Alternative (LGA) – A supplemental environmental document is being prepared to identify the alignment and station location through the City of Bakersfield, which came out of a lawsuit settlement agreement between the Authority and the City of Bakersfield in 2014.

Together with the Federal Railroad Administration, the federal lead agency for environmental review, we are improving how we advance environmental clearance and have updated the environmental review schedule in order to work more closely with our partners in managing environmental reviews and, in part, manage schedule risk. The 2016 Business Plan established a very important goal – to make the Phase 1 system between San Francisco and Los Angeles/Anaheim shovel ready as quickly as possible. To achieve that, we established a timeline to get environmental clearance on all project sections by the end of 2017. We remain committed to completing environmental reviews expeditiously in order to provide clarity to local communities, stakeholders and regional partners as to the route and station locations and to be shovel ready in order to facilitate intermediate improvements as funding is available.

However, our ability to expedite these reviews depends on many factors that are under the control of other agencies. For example, advancing environmental clearance involves working with multiple partners (e.g., Federal Railroad Administration, U.S. Army Corps of Engineers, etc.) each of which are required to comply with or address their own statutory mandates and/or may face resource constraints. These constraints can be mitigated through changes in process and/or new statutory or regulatory changes.

In response, we are improving how we advance environmental clearance in two very important ways.

- First, we are now identifying a preferred alternative in advance of issuing the draft environmental documents, as required by recent environmental streamlining legislation, instead of deferring it until the end of the process.

- Second, although we previously planned to complete all environmental clearances by December 2017, together with the Federal Railroad Administration, we have updated our schedule to provide more involvement by our partners, particularly on complex technical and/or environmental issues.

TABLE 4.0 PROJECTED ENVIRONMENTAL SCHEDULE

SECTION	ANTICIPATED RECORD OF DECISION
San Francisco to San Jose	2018
San Jose to Merced	2018
Merced to Fresno Central Valley Wye	Completed 2018
Fresno to Bakersfield Locally Generated Alternative	Completed 2018
Bakersfield to Palmdale	2018
Palmdale to Burbank	2018
Burbank to Los Angeles	2018
Los Angeles to Anaheim	2018
Los Angeles to San Diego (Phase 2)	TBD
Merced to Sacramento (Phase 2)	TBD

*Projected dates are still undergoing development with the Federal Railroad Administration.

Preferred alternatives have already been identified for the Central Valley Wye and the Bakersfield Locally Generated Alternative and we are targeting identifying all preferred alternatives and issuing draft environmental documents by or before the end of 2017 for the remaining Phase 1 project sections. This schedule is still undergoing development with the Federal Railroad Administration. This reflects our commitment to collaborate with our partners and ensure that the high-speed rail system fulfills its objectives, minimizes impacts, protects the environment and enhances communities.

In support of this effort, on February 24, 2017, Governor Brown, in response to the Trump Administration's recent Executive Order 13766, sent to the President and the Acting Chair of the Council on Environmental Quality, a letter requesting the expedited federal environmental review of 10 of California's highest-priority infrastructure projects, of which high-speed rail was included. The President's Executive Order, which allows for the expediting of environmental review and approval for high-priority infrastructure projects, is intended to cut through federal red tape and would help position the high-speed rail program to be ready to utilize future funding as well as to continue creating thousands of jobs in communities throughout the state.

This revised schedule will not affect the delivery of the Silicon Valley to Central Valley Line as described in the 2016 Business Plan. Risks to the identified schedule will be mitigated in a number of ways, including advancing preliminary engineering further before handing the design off to a design-build contractor, having procurements ready to issue once environmental clearance is achieved, and conducting right of way mapping and surveying prior to final environmental clearance which will allow entering in the acquisition process quickly.

CONSTRUCTION SCHEDULE

Central Valley

As discussed earlier in this report, Tutor Perini/Zachry/Parsons (TPZP) has made significant progress advancing construction work on Construction Package 1, the 32-mile stretch between Avenue 19 in Madera County to East American Avenue in Fresno County, with contract completion expected by September 2019.

The Authority entered into an inter-agency agreement with the California Department of Transportation to manage an approximately 2.5-mile realignment of State Route 99 within the limits of Construction Package 1, the purpose of which is to create adequate space for high-speed rail between Union Pacific Rail Road and State Route 99. The construction work is being conducted by Granite Construction Company with contract completion scheduled for June 2018.

In 2016, work began on Construction Package 2-3, the 65-mile segment between East American Avenue in Fresno County and one-mile north of the Tulare-Kern County line. Recently, Dragados/Flatiron Joint Venture (DFJV), the design-build contractor, started major construction activities near Manning and Cedar Avenue in Fresno County. Contract completion is scheduled for August 2019.

On April 15, 2016, a Notice to Proceed was issued to California Rail Builders, the design-build contractor for Construction Package 4 for the third construction contract executed in the Central Valley. It covers a

22-mile segment bounded by a point approximately one-mile north of the Tulare/Kern County Line at the terminus of Construction Package 2-3 and Poplar Avenue, just north of Shafter, to the south. Contract completion is expected by June 2019.

Phase 1 Program Schedule

As previously noted, the 2016 Business Plan laid out a new implementation strategy which focuses on completing construction on the Silicon Valley to Central Valley Line and opening it for passenger service in 2025. It also focuses on completing environmental reviews and making early strategic investments throughout the Phase 1 system, linking them together over time, completing construction on the full Phase 1 system in 2028, with service on the entire system in 2029. This represents a change from the 2014 Business Plan and the 2015 Project Update Report, which showed completing an initial line from Merced to the San Fernando Valley first. This new implementation schedule is reflected in Table 4.1.

As we have advanced the environmental process since the 2012 Business Plan, which is the baseline for Project Update Reports, new alternatives or refinements have been introduced and evaluated in almost every project section. These include, among other things, evaluating shorter or longer alignments or more or less tunneling, shifting alignments to minimize impacts to waterways or local communities and evaluating the best options for traversing through urbanized areas. One example is the Los Angeles to Anaheim section, where the scope was significantly expanded to fulfill a commitment for one-seat ride service in to Anaheim which introduced new alternatives for that section. Another is the Central Valley Wye where, after several years of evaluating multiple alternatives, the Authority identified a preferred alternative in January 2017. It was essential to take the time necessary to evaluate a wide range of alternatives in order to balance operational needs, impacts to businesses and address impacts to an environmental justice community.

The current schedule for completing environmental reviews – as compared to the schedule anticipated in 2012 – reflects the complexity of clearing a new 500-mile high-speed rail corridor, while also working to protect critical natural resources and species, developing routes and station locations in consultation with local communities to minimize impacts and maximize benefits, and meeting statutory and regulatory requirements. Our commitment to expedite the environmental review process as quickly as possible is balanced by our commitment to ensure that we "do it right" for the people of California.

TABLE 4.1 PROJECTED MILESTONES FOR ENVIRONMENTAL REVIEW PROCESS/CONSTRUCTION

Section		Receive Record of Decision[1]	Complete Construction
Merged - Fresno	2012 BASELINE PUR 2015	JUNE 2012 SEPTEMBER 2012 COMPLETED	2018 2019[2]
Supplemental – Central Valley Wye	REVISED	2018	2025[3]
Fresno - Bakersfield	2012 BASELINE PUR 2015	DECEMBER 2012 JUNE 2014 COMPLETED	2018 2019
Supplemental – Locally Generated Alt	REVISED	2018	2025[4]
San Francisco - San Jose[5]	2012 BASELINE 2015 PUR REVISED	December 2014 2017 2018	2028 2028 2025
San Jose - Merced	2012 BASELINE 2015 PUR REVISED	December 2013 2017 2018	2026 2026 2025
Bakersfield - Palmdale	2012 BASELINE 2015 PUR REVISED	December 2014 2017 2018	2021 2021 2029
Palmdale - Burbank[6]	2012 BASELINE 2015 PUR REVISED	December 2013 2017 2018	2022 2022 2029
Burbank - Los Angeles	2012 BASELINE 2015 PUR REVISED	October 2013 2017 2018	TBD TBD 2029
Los Angeles - Anaheim	2012 BASELINE 2015 PUR REVISED	December 2014 2017 2018	TBD TBD 2029
Merced - Sacramento (Phase 2)	2012 BASELINE	TBD	TBD
Los Angeles - San Diego (Phase 2)	2012 BASELINE	TBD	TBD

1 - Projected dates are still undergoing development with the Federal Railroad Administration.

2 - Construction schedule applies to Construction Package 1 from Avenue 19 in Madera to East American Avenue in Fresno.

3 - The 2016 Business Plan assumes that the leg connecting Avenue 19 to Carlucci Road is constructed as part of the Silicon Valley to Central Valley Line by 2025; it also identifies a potential single-track extension from Merced to Carlucci Road as a priority to also be completed by 2025 should additional funding become available. The third leg connecting Avenue 19 to Merced would be completed in 2029 as part of Phase 1.

4 - Construction schedule applies to Construction Packages 2-3 and 4 from East American Avenue in Fresno to Poplar Avenue north of Shafter.

5 - The 2016 Business Plan identifies initial improvements in this section to allow reasonable operation of high-speed rail trains in the Caltrain corridor by 2025 should additional funding become available with the full buildout of the section completed in 2029 as part of Phase 1.

6 - In 2014, the Palmdale to Los Angeles Project Section was split into two sections, Palmdale to Burbank and Burbank to Los Angeles.

5. Milestones Achieved
Since the 2015 Project Update Report

Over the past two years, significant progress has been made in implementing the statewide high-speed rail program that will connect and transform California. Many of the milestones in this section represent significant steps in moving the program forward on a number of fronts including environmental clearance, construction and collaborative partnership agreements.

2016 BUSINESS PLAN ADOPTED

On April 28, 2016, the Board of Directors adopted the 2016 Business Plan, which lays out an approach to sequencing the Phase 1 system within existing identified funding sources that will ultimately connect San Francisco/Merced to Los Angeles/Anaheim via the Central Valley with high-speed passenger rail service. The plan was delivered to the Legislature on May 2, 2016. The 2016 Business Plan set forth a plan to complete the construction of a high-speed rail line between the Silicon Valley and the Central Valley and open for passenger service starting in 2025, with the goal of having the full Phase 1 system in operation in 2029. It summarized the progress made over the last two years, updated available funding and financing, ridership and revenue and other forecasts, and updated risk management information. The public review process included a 60-day review period and included three legislative hearings. More than 300 public comments were received.

FUNDING PLANS – CENTRAL VALLEY AND SAN FRANCISCO TO SAN JOSE

In January 2017, a Central Valley Segment Funding Plan and San Francisco to San Jose Peninsula Corridor Segment Funding Plan[5], along with corresponding Independent Consultant Reports, were submitted to the Director of Finance and the Chair of the Joint Legislative Budget Committee. These two funding plans are integral to advancing the Silicon Valley to Central Valley Line for passenger service in 2025 and are required for the Authority to expend bond funds approved under Proposition 1A and allocated by SB 1029. The Director of Finance is required to review each plan submitted by the Authority within 60 days of submission. If the Director finds that the Funding Plans are likely to be successfully implemented as proposed, the Authority may enter into commitments to expend the bond funds as described in the Funding Plans.

ARRA EXPENDITURES BY 2017

Of the $3.48 billion in federal funds that the Authority has secured to date to advance the program, $2.55 billion is funding through the American Recovery and Reinvestment Act (ARRA) which was enacted in 2009 in response to the recession. ARRA was intended to stimulate the economy, create jobs, spur technological development, and build new transportation infrastructure that provides long-term economic benefits. The ARRA funds for high-speed rail, which are matched with state and local funds are directed toward construction in the Central Valley, as well as continuing to advance engineering and environmental reviews along the entire Phase 1 system from San Francisco/Merced to Los Angeles/Anaheim. A key provision of the federal statute is that all funds provided through ARRA must be fully

SB 1029 PROJECT UPDATE REPORT

Section (f)

A summary of milestones achieved during the prior two–year period and milestones expected to be reached in the coming two–year period.

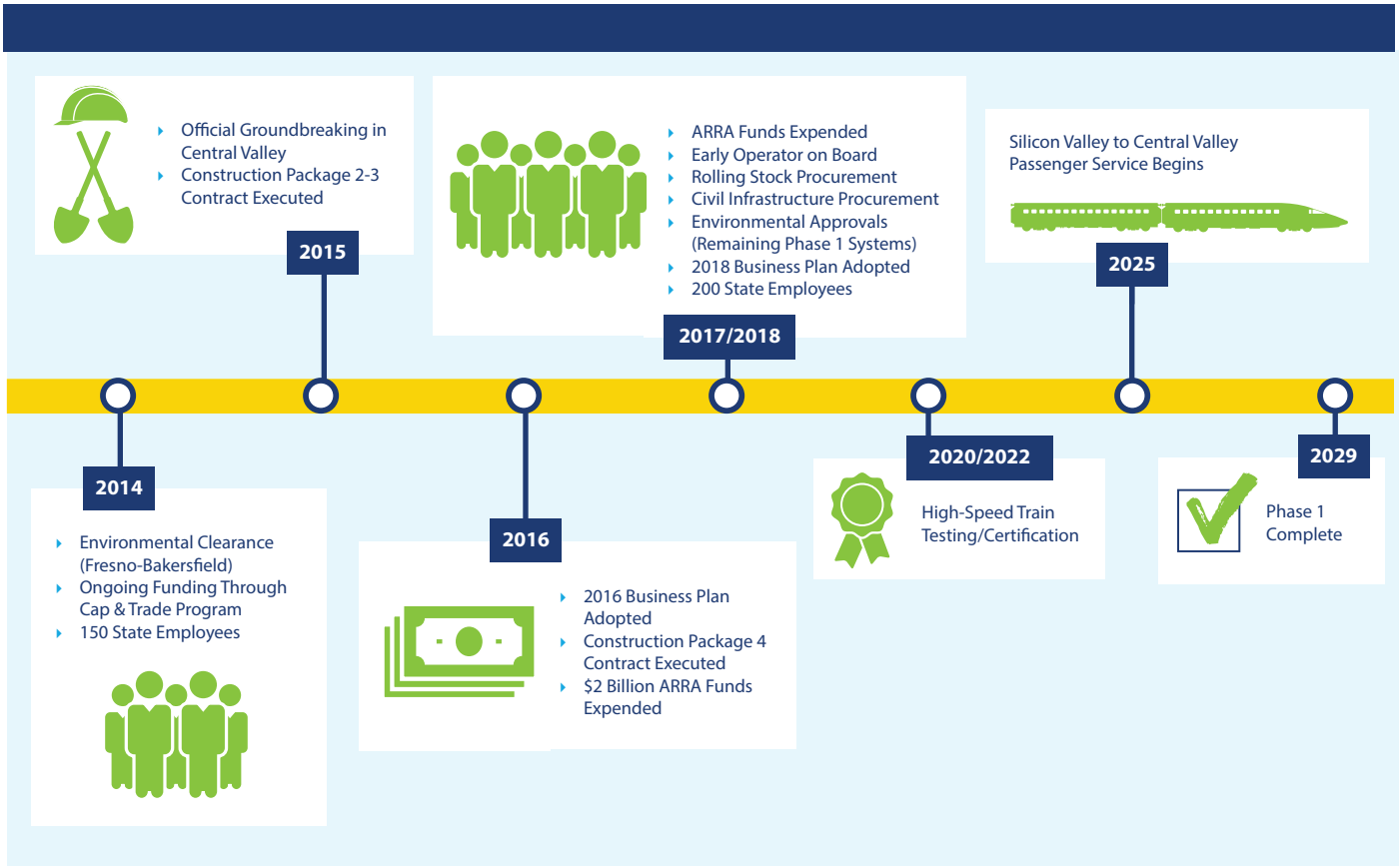
expended by September 30, 2017. The Authority has worked collaboratively with the Federal Railroad Administration (FRA) through its grant agreement to meet this objective and ensure that the benefits associated with these economic stimulus funds are used to put Californians and small businesses to work on this significant expansion to California's transportation system capacity. As of February 21, 2017, $2.29 billion or 89.7 percent had been invoiced and submitted for reimbursement to FRA. The Authority anticipates that the full $2.55 billion will be expended as of April 2017, prior to the deadline.

AMENDED FEDERAL GRANT AGREEMENTS

The federal ARRA grant was awarded prior to the Legislature's commitment of ongoing annual Cap and Trade proceeds and the Authority's adoption of the 2016 Business Plan. As a result, the grant agreement did not align with the current status of the program. The Authority and FRA amended the ARRA grant agreement in May 2016 and made a number of technical fixes and other adjustments to reflect the changed circumstances around the program and progress that has been made since it was originally executed in 2010.

Key amendments to the agreement included:

- Modification of the overall project (the work funded with the grant) schedule from 2018 to 2022 to incorporate the Central Valley segment into the operating segment consistent with the 2016 Business Plan.
- Establishment of a working capital account for right of way – ensuring that sufficient funding is available to maintain the pace of right-of-way acquisition without limitation. This streamlines the payment process.



- Continuity of the "tapered match" approach, which allows for the expenditure of federal funds first followed by the use of state funds.
- Amendment of the grant budget to include the Construction Package 1 northern extension to Madera and the purchase of radio spectrum to support train communications and safety measures.
- Increasing the amount of ARRA funding that can be expended on project development.

In January 2017, the Authority and FRA also completed an amendment to the $929 million High-Speed Intercity Passenger Rail grant, funded by the FY 10 Consolidated Appropriations Act. This agreement had not been amended since it was signed in November 2011. An update to this companion grant to the ARRA grant described above was necessary to align the grants' scopes of work, as well as periods of performance.

INVESTMENTS IN BOOKEND AND CONNECTIVITY PROJECTS BRINGS EARLY PROGRESS AND ADVANCES THE STATEWIDE RAIL MODERNIZATION PROGRAM

In 2012, Senate Bill (SB) 1029 appropriated $2 billion in Proposition 1A funds that will leverage approximately $5 billion in additional funding for bookend and connectivity projects. These investments are strengthening and improving existing passenger rail networks, while also connecting them with the future high-speed rail system. As they are completed, they will begin generating significant near-term benefits—capacity, frequency, reliability and safety for regional and interregional rail services—as well as air quality improvements and economic benefits. The Authority has achieved early approval and

release of Proposition 1A dollars for construction of a number of regionally significant connectivity projects, most notably in the heavily congested urban rail corridors in Northern and Southern California.

There was also substantial investment in SB 1029 for blended operation bookends of the Phase 1 system to be funded through Memoranda of Understanding totaling $1.1 billion. This funding is the subject of two Memorandum of Understanding (MOU) with agency partners in Northern and Southern California.

Supplement to the Northern California MOU

In 2016, the Authority and its partners agreed to a supplement to the MOU with Northern California agencies to increase funding for the Peninsula Corridor Electrification Project to a total of $713 million. Bids to design and construct the project were received that identified costs at $1.98 billion. The MOU was updated to reflect the increased costs and funding contributions by the multiple stakeholders. The partners continue to work together to identify multiple sources of funds for the important and foundational project.

Rosecrans-Marquardt Grade Separation Project

In Southern California, the Authority continues to work with partner agencies to advance early investments associated with the MOU. These include the Doran Street Grade Separation and Link Union Station (Link US) Project, the State College Grade Separation and the Fullerton Junction. The Rosecrans-Marquardt Grade Separation project has been identified as the first project to be funded using funds set aside for the Southern California MOU as a part of SB 1029. The Authority will contribute up to 50 percent of the capital costs for the Rosecrans and Marquardt Avenues grade separation project in Santa Fe Springs. This intersection has been rated by the California Public Utilities Commission (CPUC) as the most hazardous grade crossing in California which is traversed by over 110 freight and passenger trains and over 52,000 vehicles every day. The Los Angeles County Metropolitan Transportation Authority (Metro) is the lead agency in collaboration with the Federal Railroad Administration, Caltrans, the CPUC, BNSF, the City of Santa Fe Springs and other regional/local partners. This project will provide significant near-term mobility, safety, environmental and economic benefits to the region by making necessary improvements for high-speed rail service. In addition, the safety benefits this projects will bring will also increase passenger rail capacity to the Inland Empire by 60 percent.

The Authority is working closely with its Southern California transportation partners to prepare the detailed funding plan required under Proposition 1A.

Rosecrans-Marquardt Grade Separation in Southern California

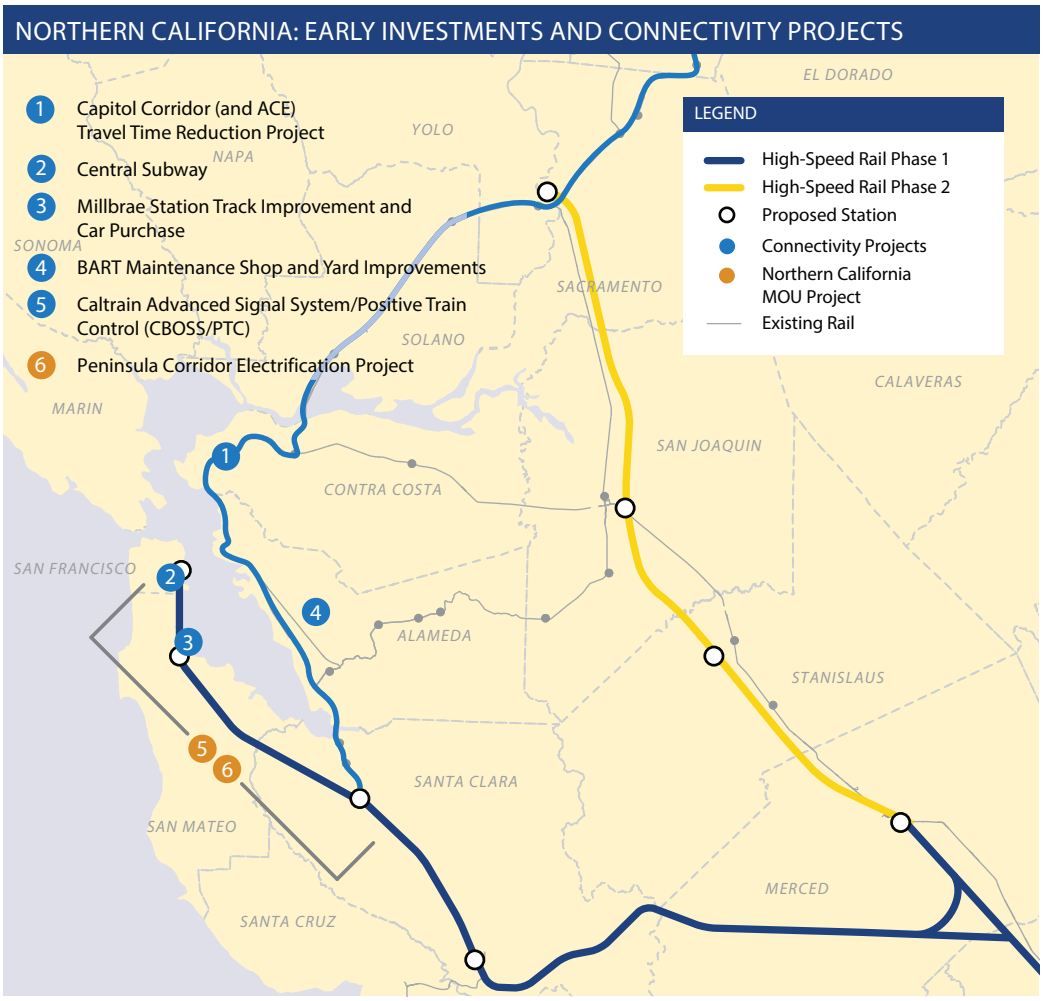
The Authority is funding a portion of the project to grade separate Rosecrans and Marquardt Avenues in Santa Fe Springs. This intersection has been rated by the California Public Utilities Commission as the most hazardous grade crossing in the State of California – with over 52,000 vehicles and around 110 trains using this grade crossing every day. See why the high-speed rail program is investing in this key safety improvement project that will benefit drivers and pedestrians, and improve overall regional mobility:
www.youtube.com/watch?v=GGL2WTHMdqU&feature=youtu.be

Statewide Rail Modernization and Senate Bill 1029 Early Investments

Senate Bill 1029 also appropriated $819 million in Proposition 1A dollars for 17 regionally significant connectivity projects that will provide direct connectivity to high-speed rail lines and facilities. Over 50 percent of the Proposition 1A dollars for these projects have been expended. Caltrans manages and oversees the disbursement of funds.

Northern California

While the Authority has begun construction of high-speed rail in the Central Valley, additional investments are also underway on improvements to existing systems throughout Northern California. Funding of these connectivity projects will generate early benefits to existing regional transportation systems and enhance access to the future high-speed rail. These projects include:



- **Caltrain Advanced Signal System (CBOSS/PTC) –** Part of the Caltrain Modernization Program (which also includes the Peninsula Corridor Electrification Project) consists of installing positive train control technology along the Caltrain corridor.

- **San Francisco Municipal Transportation Agency Central Subway –** Extends the light rail line from the Caltrain depot at 4th and King Street to Union Square and Chinatown by 1.7 miles.

- **Millbrae Station Track Improvements and Car Purchase –** Lengthens rail storage tracks south of the station and involves purchase of 46 new rail cars. Six pilot vehicles have been delivered for testing.

- **BART Maintenance Shop & Yard Improvements –** Expands the existing Main Shop to support double-ended operation and improvements to connect the Hayward Maintenance Complex to the existing mainline BART tracks.

→ **Positive Train Control (PTC) of the San Joaquin Corridor –** PTC improvements to these Amtrak lines are designed to improve safety in the corridor. Project is complete and all funds expended.

→ **Capitol Corridor (and ACE) Travel Time Reduction Project –** Reduces total travel time through alignment improvements to curves and replacing existing rail to allow higher operating speeds.

Southern California

The Authority is working with the California State Transportation Agency, regional and local partners to advance planning and investments in network integration and rail modernization. This includes investments in the shared use urban rail corridor connecting Burbank, Los Angeles and Anaheim, which is part of the second busiest passenger rail corridor in the U.S. In 2012, Senate Bill SB 1029 provided an additional $239 million for connectivity projects in Southern California which include:

SOUTHERN CALIFORNIA: EARLY INVESTMENTS AND CONNECTIVITY PROJECTS
1 Positive Train Control, Metrolink
2 Positive Train Control, NCTD
3 Positive Train Control, Los Angeles to Fullerton
4 New Tier 4 Locomotives, Metrolink
5 Regional Connector, Metro
6 Blue Line Improvements, MTS
7 Link Union Station (Early Investment)
8 Rosecrans/Marquardt Grade Separation (Early Investment)
9 Doran St and Broadway/Brazil Grade Separation (Early Investment)
10 State College Grade Separation (Early Investment)
11 Fullerton Junction (Early Investment)
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
ORANGE COUNTY
SAN DIEGO COUNTY
LEGEND
High-Speed Rail Phase 1
High-Speed Rail Phase 2
Proposed Station
Proposed Station (Optional)
Metrolink, NCTD
Connectivity Projects
Southern California MOU Project

→ **Positive Train Control: Metrolink and San Diego North County Transit District (Coaster) –** Installation of predictive collision avoidance technology.

→ **Metrolink High-Speed Rail Readiness Program –** Purchase of Tier 4 Locomotives for Metrolink. The locomotives are projected to be delivered 2019.

→ **LA Metro Regional Rail Connector –** Construction of a two-mile extension that will connect the Metro light rail system to high speed rail through downtown, including construction of three new underground light rail stations.

→ **Blue Line Improvements –** Improvements to existing infrastructure including tracks, switches, signaling and existing platforms to accommodate low-floor vehicles. All work was scheduled to be completed by December 2016.

LOS ANGELES UNION STATION PLANNING AGREEMENT (LAUS)

The Authority is also collaborating with LA Metro to advance planning for integration of high-speed rail at Los Angeles Union Station, a major regional gateway offering passengers connections to local, regional and intercity passenger rail systems and other travel options. This is part of a broader regional undertaking with other major transit operators to plan for how to integrate all services operating at the station. It is designed to increase rail capacity, improve access and connectivity, improve air quality and modernize the passenger concourse area. In 2016, the Authority Board of Directors approved up to $15 million to help fund engineering and technical studies and to environmentally clear a range of investments to help modernize and integrate high-speed rail at Los Angeles Union Station.

SAN MATEO GRADE SEPARATION PROJECT MEMORANDUM OF UNDERSTANDING

In August 2016, the Board of Directors approved executing an Memorandum of Understanding to contribute $84 million towards three connected grade separations. This work is subject to further technical and environmental analysis, but would allow for the construction of improvements associated with the blended service corridor. These grade separations are on the California Public Utilities Commissions list of top priorities for safety improvements and will be necessary for high-speed rail operations.

HIGH-SPEED RAIL IS HAPPENING AT MULTIPLE CENTRAL VALLEY CONSTRUCTION SITES

Two years have passed since the Authority officially broke ground on construction in the Central Valley in 2015 and now 119 miles of construction are underway. Workers and residents of the Central Valley are already seeing the benefits of this monumental rail project. The monthly construction updates issued by the Authority provides the latest highlights on construction. In addition, up-to-date information on the high-speed rail construction can be found at ***www.buildhsr.html***. This site provides the latest information about construction, local road closures and detours, upcoming public forums and the latest photo's, animations and renderings of what's being built. The Authority Board of Directors is also provided monthly updates on construction as part of regular Finance and Audit Committee monthly status reports on the design-build contracts, including financial information as well as what work is currently underway and coming up next.

Laborer Glen Matheny (right) received a personal thanks from Governor Brown when he stopped by the Fresno Trench Project in September 2016.

GOVERNOR BROWN TOURS CENTRAL VALLEY CONSTRUCTION

On September 14, 2016, Governor Edmund G. Brown Jr. joined legislative, environmental, business and community leaders in Fresno to sign legislation that directs $900 million in Cap and Trade funds to greenhouse gas reducing programs that benefit disadvantaged communities, support clean transportation and protect natural ecosystems. En route to the bill signing ceremony, the Governor visited the Fresno Trench construction site and visited with workers. He also met workers who had just started on the project who were benefiting from the new construction jobs being added as a result of the program.

FORMER U.S.D.O.T SECRETARY FOXX TOURS CENTRAL VALLEY CONSTRUCTION

On October 17, 2016, former U.S. Department of Transportation Secretary Anthony Foxx toured construction sites of the nation's first high-speed rail system in the Central Valley. Secretary Foxx, accompanied by California State Transportation Agency Secretary Brian Kelly and Authority CEO Jeff Morales, visited three active work sites. The tour provided an opportunity to show how federal dollars were being put to use to create jobs, put small businesses to work and build the project. While on the tour Secretary Foxx had the opportunity to speak with construction workers about their roles on building high-speed rail.

SUSTAINABILITY IN ACTION

In December 2016, the Authority issued its first annual Sustainability Report that describes the innovative approach the Authority is taking to designing and building the system. As the backbone of a modern, statewide rail network, high-speed rail is a cornerstone of California's cutting edge policies to tackle climate change and protect the environment. The report highlights the Authority's objectives, plans and progress on several fronts including energy, natural resources, public health, station communities, habitat protection and other priorities.

The Authority is committed to recycling 100 percent of the steel and concrete used during construction and to divert at least 75 percent of all waste from landfills. It is working with its contractors to reduce greenhouse gases and air pollution emissions generated during construction; in 2015, more than 12,000 metric tons of greenhouse gas emissions were avoided by recycling 99 percent of construction materials. The Authority's contractors are also using some of the most environmentally friendly Tier IV construction equipment available, dramatically reducing air pollutants released during construction. Sustainability will also permeate all aspects of the system when it begins carrying customers. Over time, the average annual greenhouse gas emissions savings of the system is projected to be equivalent to taking 285,000 passenger vehicles off the road every year.

Both public and private organizations are taking notice of the Authority's progress and commitment to sustainability. Recently the high-speed rail program was included in the first international assessment of the environmental, social and governance performance of infrastructure assets and real estate portfolios. This notable assessment was conducted by a range of global infrastructure investors, representing $1.5 trillion in assets, who are developing a tool to help investors make informed decisions regarding which projects or programs demonstrably contribute to infrastructure that is low-carbon, climate resilient and socially inclusive. For more information, read the Sustainability Report at: ***www.hsr.ca.gov/docs/programs/green_practices/sustainability/Sustainability_Report_Dec_2016.pdf***

"The Sustainability Report shows that California has embedded the concept of sustainability into every element of the High-Speed Rail project. Not only will it transform the transportation system of California leading to reductions in emissions of greenhouse gases and other pollutants, it is already showing how infrastructure projects – both large and small – can be built sustainably at every stage."

Richard Corey
Executive Officer
California Air Resources Board

RENEWABLE ENERGY POLICY

The Authority is committed to using 100 percent renewable energy for powering the system. This is a unique commitment and reflects the abundance of renewable energy resources in California: sun, wind, geothermal, and bioenergy. While the precise contracts and agreements will be worked out over the next several years, the ultimate result will be a net-zero rail system. Net-zero is achieved by procuring or producing enough renewable energy to offset the amount of energy the system takes from the state's power grid to operate trains and facilities. A net-zero rail system will increase the environmental benefits and reinforce California's renewable energy economy, while providing the Authority with a cost-stable source of electricity.

STATEWIDE URBAN FORESTRY PROGRAM

In March 2016, the Authority entered into an agreement with the California Department of Forestry and Fire Protection to plant hundreds of thousands of trees to offset emissions that have been created during construction. The Statewide Urban Forestry Program will target communities in the vicinity of the rail system, with special focus on providing benefits to disadvantaged communities. Trees will provide added benefits by improving urban air quality, reducing energy use by providing shade, improving storm water runoff, preventing soil erosion and restoring habitats.

CALIFORNIA ENERGY COMMISSION MEMORANDUM OF UNDERSTANDING

In June 2016, the Authority and the California Energy Commission (Energy Commission) announced a Memorandum of Understanding (MOU) that will ensure that the high-speed rail program will help California meet its climate goals and become a greener state. The general objectives of the MOU are to expand the use of renewable energy, zero net energy buildings and zero emissions vehicles in California. The Authority is committed to powering the high-speed rail system with 100 percent renewable energy sources, maximizing the reduction of greenhouse gas emissions throughout design and construction, and making energy efficiency a priority in design.

MAJOR CONTRACTS AND PROCUREMENTS

Early Train Operator

In December of 2016, the Authority released a Request for Qualifications for Early Train Operator services to assist with the development and management of the initial system operations. Early engagement of a train operator will help to move the program beyond planning, design and construction toward commercial operations. The 2016 Business Plan called for this early engagement of a train operator to ensure an operator's perspective is considered in the planning and design of the infra-

structure, stations, high-speed trains and facilities. The Early Train Operator will advise the Authority on strategies to improve asset performance and revenues, while managing and reducing program costs. It is anticipated that this procurement will be completed in 2017 with the selection of an operator and a notice to proceed.

Integrated Rail Delivery Partner

As the high-speed rail program has transitioned from planning to delivery, the Authority Board of Directors approved in June 2015 a Rail Delivery Partner (RDP) contract that takes a new and expanded approach to the delivery of the nation's first high-speed rail program. This new partnership – led by WSP | Parsons Brinckerhoff - recognizes a shift in the program from planning to construction and draws on a seasoned team of international experts with experience delivering high-speed rail systems from around the world. WSP | Parsons Brinckerhoff is a global consulting firm that assists public and private clients to plan, develop, design, construct, operate and maintain critical infrastructure. Network Rail Consulting is also providing major contributions as members of the RDP team. Network Rail Consulting is a London-based international consulting arm of Network Rail, which is responsible for operating and maintaining the United Kingdom's railway network.

New Financial Services Advisor

In June 2016, the Authority procured the services of KPMG LLC for financial advisory services. Expert financial advisory services are critical not only to support the Authority in the fiscal management of the high-speed rail program, but to ensure that all opportunities for efficiencies and private sector involvement are evaluated and explored effectively. Financial advisory services are also essential as the program transitions from a planning organization to an implementation organization.

Environmental and Engineering

HNTB Corporation (HNTB) was awarded the contract to conduct preliminary engineering and environmental services for the San Francisco to San Jose and San Jose to Merced project sections. The two project sections extend approximately 135 miles and will connect the Bay Area to the Central Valley. HNTB is assisting the Authority in further defining and environmentally clearing high-speed rail blended operations along the Caltrain Corridor from 4th and King Streets in San Francisco to the Tamien Station in San Jose and from San Jose to the Central Valley Wye through Gilroy.

Right-of-Way Services

With over 1,600 parcels necessary for construction of the initial Central Valley portion of the line, the Authority began taking steps to augment its right of way services contracts in an effort to streamline and improve the process. In February 2017, the Authority awarded six new contracts to help accelerate the right of way acquisition program, which are now in the process of being executed. In January 2017, the Authority released the first of five Requests for Qualifications for additional right of way engineering and support services for the Silicon Valley to Central Valley Line. The goal is to have as much of the appraisal work finished as possible when environmental clearance is complete, so that the purchase of the estimated 1,800 parcels that will be necessary can begin as quickly as possible.

Habitat Restoration

In June 2015, the Authority secured habitat mitigation services through a contract with Westervelt Ecological Services to deliver environmental mitigations solutions in the Central Valley. This contractor will assist the Authority in its commitment to building a high-speed rail system that minimizes impacts to the natural and built environment, encourages compact land development around transit stations, and helps California manage its pressing issues with climate change, traffic and airport congestion, and energy dependency.

Additionally, the Authority executed a contract with the Lazy K Ranch, a working horse and cattle ranch in Chowchilla, to secure a 446-acre parcel for habitat mitigation. This is a unique parcel that is contiguous with a much larger site, allowing the expansion and connection necessary for quality habitats and providing a matrix of seasonal ponds, thereby improving the overall quality of the mitigation site.

In addition to the Lazy K Ranch, the Authority, working through Westervelt Ecological Services, has recently secured the rights to establish a conservation easement on 822 acres along Cross Creek in Kings and Tulare counties. This conservation easement will preserve some of the last remaining intact parcels of pristine vernal pool grasslands along an important wildlife movement corridor that supports species such as the California Tiger Salamander, San Joaquin Kit Fox, and vernal pool invertebrates.

Geotech Northern California Site Contract for Silicon Valley to Central Valley Line

In August 2016, the Authority secured geotechnical site investigative services for the Silicon Valley to Central Valley Line. These services provide surface and subsurface information in the planning and design of the program. This work will assist the Authority in the preparation for design and construction and advances critical information needed during the construction procurement. This information will provide bidders a common foundation that will reduce risks associated with design-build contracts by providing more detailed information to inform procurement documents and the resulting bids. This will help mitigate schedule risks associated with the updated environmental schedule.

MAJOR AGREEMENTS

BNSF Agreement

The Authority has completed various agreements with BNSF, including purchase and sales for real property, construction and relocation, overcrossings and joint corridor use agreements. The overall purpose of these agreements is to allow the Central Valley segment to be built adjacent to, over and under the existing BNSF freight line. Real property will be purchased from BNSF and some of the BNSF tracks and facilities will be relocated. Appropriate barriers will be placed between freight and passenger operations in areas of closer proximity to ensure safety of operations. These agreements also include terms related to adjacency once high-speed rail operations begin, including indemnity, insurance and safety features.

Broadband Initiative CENIC Agreement

In November of 2016, the Authority and the Corporation for Education Networking Initiatives in California (CENIC) entered into a Memorandum of Understanding that will foster initiatives to expand the availability and accessibility of high-capacity broadband to communities and institutions throughout California. As a part of the high-speed rail system corridor, the Authority and CENIC will create an ultra-fast broadband network, connecting into CENIC's statewide research and education network as well as to other public and private sector broadband networks.

Acquisition of Radio Spectrum for Train Communication

In April 2016, a major milestone in safety and security occurred when the Authority Board of Directors approved the acquisition of exclusive rights to the radio spectrum needed to operate future communications systems for its trains. The agreement to purchase 44 frequencies is critical for the development of secure and reliable train communication systems. These systems include positive train control, a state-of-the art collision avoidance technology that allows trains, tracks and dispatch centers to actively communicate with each other. Radio spectrum is also needed to monitor train conditions and diagnostics and to operate security systems along the high-speed rail system.

Station Area Planning

As part of the federal grant agreement, the FRA and the Authority have set aside funds to work with station cities to plan for growth and transportation access to and around high-speed rail stations.

Northern California – The Authority has entered into station area planning agreements with the City of San Jose (April 2016) and with the Santa Clara Valley Transportation Authority (VTA) in September of 2016 related to transportation master planning around the station. An existing agreement with the city of Gilroy was already in place.

Central Valley – Agreements are in place and have been amended with the cities of Fresno, Merced and Bakersfield. In addition, an agreement was executed in April 2016 with the Tulare County Association of Governments (TCAG) to consider regional access improvements surrounding the Kings/Tulare station.

Southern California – The Authority executed an agreement with the City of Palmdale in April 2015, followed by an agreement with the City of Burbank in late 2015. Work has begun to identify alternative station area scenarios. In addition, as mentioned previously, the Authority is working with Los Angles Country Metropolitan Transportation Authority on master planning efforts in and around Los Angeles Union Station.

GOVERNANCE AND OVERSIGHT

The Authority is governed by a nine-member Board of Directors (5 appointed by the Governor, 2 appointed by the Senate Committee on Rules and 2 by the Speaker of the Assembly). Within the Board, there is an elected chair and vice-chair.

Dan Richard is the Board Chair, Chair of the Transit and Land Use Committee and was appointed by the Governor. He is the principal of Dan Richard Advisors since 2010. He was formerly managing partner and co-founder of Heritage Oak Capital Partners, an infrastructure finance firm, and a senior vice president of public policy and governmental relations at Pacific Gas and Electric Company. He was elected to the San Francisco Bay Area Rapid Transit District and served twice as president of the Board and served as Governor Brown's deputy legal affairs secretary.

Tom Richards is the Vice Chair and was also appointed by the Governor. He is currently Chair and CEO of The Penstar Group, a Fresno-based real estate investment, development and construction company. He works with local government leaders to address homelessness issues in Fresno and Fresno County and chairs the Fresno First Steps Home Initiative. He is a board member of Fresno's Property Based Improvement District and Chair of both the Fresno Regional Workforce Investment Board and Premier Valley Bank.

Lou Correa is a former state senator, representing Anaheim and Orange counties, was appointed to the Authority Board of Directors in March 2015. He stepped down in November 2016 with his election to the U.S. Congress. This position is currently unfilled.

Daniel Curtin is currently a member of the California Water Commission and also serves on the California State Compensation Insurance Fund. He is a graduate of the City College of New York. Toni G. Atkins, Speaker of the Assembly, appointed Curtin to the Authority Board in May 2015. His term lasts until the end of 2017.

Bonnie Lowenthal was a State Assembly member representing Long Beach, Signal Hill, San Pedro and Catalina Island. Ms. Lowenthal was appointed chair of the Assembly Committee on Transportation in 2010, and as an ex-officio member of the California Transportation Commission, she oversaw public investment in highway, passenger rail and transportation projects. Toni G. Atkins, Speaker of the Assembly, appointed Ms. Lowenthal to the Authority Board in January 2016 to replace outgoing Vice-Chair Thea Selby.

Lorraine Paskett has more than 25 years in the energy, water and environmental sectors with 15 years of focused experience in the energy sector. As owner of the Cambridge LCF Group, she works with conventional and emerging energy companies, focusing on alternative energy, energy markets, climate change policies, and improving air quality with a focus on the Los Angeles basin and the San Joaquin Valley basin. The California State Senate Rules Committee appointed Ms. Paskett to the Authority Board in January 2016 to replace former Vice-Chair Jim Hartnett who stepped down in March 2014.

Michael Rossi, board member and chair of the Finance and Audit Committee, was appointed by the Governor. He is a retired vice chairman of Bank of America Corporation. He is Chair of the Workforce Investment Board and a senior advisor for Jobs and Economic Development for Governor Brown. He is past president of the Board for the Bankers Association for Foreign Trade.

Lynn Schenk is an attorney and senior corporate advisor. Ms. Schenk brings a mix of private sector experience with public service. She has practiced general business law in San Diego, co-founded a community bank, was special counsel to a large international law firm and has served on the Board of Directors of several publicly traded companies. She was re-appointed to the Board by Governor Jerry Brown.

There are currently two vacancies on the Board of Directors.

Ex Officio Board Members to be Appointed

In 2016, the Legislature increased its direct oversight of the program when the Legislature and Governor approved Assembly Bill 1813 providing for the appointment of two non-voting ex officio members of the Board. One member is to be a Member of the Senate, appointed by the Senate Committee on Rules, and the other is to be a Member of the Assembly, appointed by the Speaker of the Assembly. As ex officio members, they will neither vote nor serve as Chair or Vide Chair of the Board of Directors.

Congressional Hearing

On August 29, 2016, the U.S. House Subcommittee on Railroads, Pipelines and Hazardous Materials conducted a field hearing in San Francisco to examine the status of the project. Board of Directors Chair

Dan Richard and Federal Railroad Administrator Sarah Feinberg were among the panelists appearing at the hearing. Both provided updates on the progress of environmental reviews and construction in the Central Valley. There was also an update on the expenditure to date of the federal American Recovery and Investment Act of 2009 funds awarded to the program, including jobs created and small businesses engaged as a result of the federal investment. The Board Chair also updated the committee on the Authority's 2016 Business Plan.

Staffing Levels Report to the Legislature

Pursuant to SB 1029 (Chapter 152, Statutes of 2012), the Authority has submitted to the Legislature three Staff Management Reports (October 2012, December 2013, and March 2015) that describe the organizational structure supporting the delivery of the high-speed rail program, as well as the staffing structure and key construction management procedures established by the Authority. The Staff Management Reports document the enhanced organizational strategies implemented by the Authority's executive management team to achieve the program goals and to implement a program funded through SB 1029 and SB 862. The Authority's fundamental strategies and principles to staffing as delineated in the prior Staff Management Reports remain unchanged.

A Staffing Levels Report was provided in accordance with the Supplemental Report of the 2015-16 Budget Act. This report required the Authority to report to the appropriate fiscal committees of the Legislature and the Legislative Analyst's Office no later than February 1, 2016 with information on state staffing levels for the Authority. Specifically, the report includes the rationale for the current state staffing level and the extent to which this staffing level is consistent with best practices for construction oversight on large projects of comparable size and scale of the California High Speed Rail project. A copy of the report can be found on the Authority's website at: ***http://hsr.ca.gov/docs/about/legislative_affairs/Transmittal_and_Staffing_Levels_Report_Feb_2016.pdf***

ConnectHSR Vendor Registry Launched

To encourage small businesses participation on high-speed rail, the Authority has developed a free, online vendor registry that allows businesses interested in subcontracting opportunities with our design-build and other prime contractors to enter their information through a quick and easy registration process. It provides the Authority's current and prospective prime contractors the capability to search for businesses interested in working on the project. Registration is open to all current contractors and prospective bidders, both large and small, and is designed in part to assist in facilitating the Authority's aggressive 30 percent goal for small business participation. A link to the registry is on the Authority's web site at: ***www.connecthsr.com***

Resolution of Legal Challenges

The Authority has resolved several legal challenges over the last few years. Most notably several environmental lawsuits have been settled including:

- Coffee-Brimhall LLC v. California High-Speed Rail Authority
- City of Bakersfield v. California High-Speed Rail Authority
- County of Kern v. California High-Speed Rail Authority

In addition, two other cases were resolved over the last two years. These included the:

- John Tos, Aaron Fukuda and County of Kings v. California High-Speed Rail Authority alleging violation of the terms of Proposition 1A by the Authority. The Court of Appeal, Third Appellate District, ruled that the (c) funding plan, developed by the Authority pursuant to SHC Section 2704.08 was compliant and Judge Kenny on February 11, 2016 and on March 4, 2016 denied the Petition and Complaint in favor of the Authority.
- Transportation Solutions Defense and Education Fund v. California Air Resources Board the court granted a motion and the Authority was dismissed from the action on November 21, 2016.

6. Future Milestones

ENVIRONMENTAL CLEARANCES AND DECISIONS ON FINAL ALIGNMENTS AND STATION LOCATIONS

The Authority is continuing to advance every Phase 1project section forward through preliminary design and environmental review. Throughout the next two years, this will include continuing to collaborate with partner agencies, corridor cities, stakeholders and community members as well as local and state leaders to advance environmental clearance of the remaining project sections. This is part of a comprehensive, ongoing outreach program that incorporates public input and feedback as the program is being developed. Moving forward to obtain environmental approvals for the full Phase 1 system will maximize the Authority's ability to advance any segment of the system as resources become available.

SB 1029 PROJECT UPDATE REPORT

Section (f)

A summary of milestones achieved during the prior two–year period and milestones expected to be reached in the coming two–year period.

CONTINUED COLLABORATION WITH COMMUNITIES ON STATION AREA PLANNING

The Authority will continue to work with local governments to develop station area plans around the future high-speed rail stations. The Authority, in partnership with the FRA, has dedicated funding to support station cities in the development of station area plans that are consistent and supportive of local and regional planning efforts required by SB 375 (Steinberg, Chapter 728, Statutes of 2008) and the Authority's Station Area Development Policies. These planning efforts focus on a range of activities to create high-speed rail stations that serve appropriate local contexts and provide community development and local economic opportunities. It will also include working with regional and local transit providers to enhance connectivity to high-speed rail stations, plan for more efficient development around stations. The work will additionally facilitate adoption or amendments to general plans and zoning codes, and help develop financing and phasing plans to support the station area plan as well as options to attract private investors. Information specific to each station can be found in the Project Update by Section.

RIGHT-OF-WAY ACQUISITION

Additional right-of-way resources will be added in 2017 to continue the development of the right-of-way acquisition program in support of the implementation of the Central Valley to Silicon Valley Line. This work will help address the evaluation of right-of-way needs for alternative alignments evaluated in the environmental documents, as well as address allowable early acquisition actions in advance of environmental clearance.

CENTRAL VALLEY CONSTRUCTION

Construction will continue throughout the next two years, and the program will deliver several construction milestones. The State Route 99 realignment project within Construction Package 1 is projected to be complete in June 2018. The remainder of Construction Package 1 between Avenue 19 in Madera County to East American Avenue in Fresno County is scheduled to be completed by August

2019. Construction Package 2-3, the 65-mile segment between Fresno County and one-mile north of the Tulare-Kern County line, is scheduled to be completed by August 2019. Construction Package 4, the 22-mile segment bounded by a point approximately one-mile north of the Tulare-Kern County Line and Poplar Avenue, is scheduled to be completed by June 2019.

PLANNING FOR OPERATIONAL ELEMENTS OF THE SYSTEM

Now that construction is well underway, the Authority is beginning to plan for operations. Procurement of an Early Train Operator is progressing, as detailed in previous sections of this report. The role of the early operator will be to advise the Authority on the design, construction and operations of the system, including the many operational elements that will support future passenger rail operations. The intent is that the firm selected would be responsible for beginning operations of the system once construction of the Silicon Valley to Central Valley Line is complete.

In addition to moving forward with an early operator, high-speed rail tracks and systems and a number of facilities will need be built to support high-speed rail service. These include heavy and light maintenance facilities to service trains, stations, maintenance facilities for rail infrastructure, a dispatching center, and headquarters. The various operational and maintenance functions will create permanent jobs and the facilities will be located at various points along the corridor to meet system needs. Facilities include:

- **Stations –** In some locations, high-speed rail will serve passengers at stations owned and operated by other transportation partners, (e.g. Los Angeles Union Station and Diridon Station in San Jose.) In other locations, the Authority is building new stations which will be owned by the State of California and managed by the system operator. Over the next several years, station designer(s) will be procured to begin station design to accommodate passengers and other station activities and services, such as ticketing, as well as amenities that might be incorporated into the stations such as retail and dining.

- **Operations Control Center and Headquarters –** The system operator will manage all of the real-time operations and actions required to operate high-speed rail passenger service. Staff at the center will use a variety of systems to dispatch and monitor trains, detect and respond to conditions, and manage schedules and personnel.

- **Maintenance of Infrastructure Facilities –** Maintenance of way facilities will be spread along the high-speed rail route and will be used to maintain the track and other infrastructure. Staff will be at these facilities 24/7 to undertake inspection and maintenance work. Staff will be dispatched from these locations to undertake work that stretches a 100 miles or more.

- **Heavy Maintenance Facility –** The Heavy Maintenance Facility will be located in the Central Valley. It will be the main location for inspecting, cleaning, repairing and maintaining the high-speed rail trains. Workers at this facility will include mechanical and electrical technicians, supervisors, laborers, cleaners, storehouse employees, and others. In addition, train engineers and crews will be dispatched from this facility to operate the trains.

- **Light Maintenance Facilities –** Two smaller maintenance facilities, one in Northern California and one in Southern California, will be built to conduct minor train maintenance functions, inspections, and other routine tasks as well as to provide alternative locations for engineer and crew dispatch to meet schedule requirements.

FUTURE PROCUREMENTS

- **Early Train Operator –** As outlined in the Milestones Section of this report, the Authority Board of Directors approved the procurement of an Early Train Operator at its December 2016 meeting, directing staff to issue a Request for Qualifications. The next steps in this process will be issuance of a Request for Proposals, the selection of an operator and a notice to proceed, which is anticipated to be completed during 2017.

- **Other Procurements for 2017-2018 –** The delivery and operation of a high-speed rail system involves procuring numerous elements and integrating them into one, contiguous operating asset. The Authority's procurement plan involves phasing numerous procurements over time based on availability of funding and financing, the goal of driving competition, and meeting schedule targets. Future procurements associated with delivering the Silicon Valley to Central Valley Line will include civil engineering packages, track and systems, station construction and high-speed trains. These procurements are in the planning and development stage.

STATEWIDE RAIL MODERNIZATION AND EARLY INVESTMENTS

Progress is underway and will continue through the next two years on multiple connectivity projects throughout the state. These projects are investments that will benefit the overall high-speed rail system and provide early benefits to local systems. In addition to funds set aside to support Caltrain Electrification and the Southern California improvements identified in the Milestones section of this report, SB 1029 allocated an additional $819 million in Proposition 1A dollars for regionally-significant connectivity projects that provide direct connectivity to high-speed rail lines and facilities. Four projects are complete and seven more are expected to be completed in the next two years.

2018 BUSINESS PLAN

Every two years, the Authority prepares, adopts, publishes, and submit a business plan to the California Legislature, per the Public Utilities Code 185033. The next Business Plan will be published in 2018. The Authority's Business Plan is an overarching policy document used to inform the Legislature, the public, and stakeholders of the project's implementation, progress, and assist the Legislature in making policy decisions regarding the project.

The 2018 Business Plan will summarize the progress made since 2016 as well as outline updates, project information, and forecasts for ridership, operation and maintenance costs, and capital costs. The 2018 plan will additionally identify key milestones and decisions that are anticipated during the next two years as well as an estimate of anticipated funding sources.

7. Issues

As with any significant capital infrastructure program, there are a variety of challenges to project delivery that need to be managed and monitored on a consistent basis. The Authority uses multiple project management tools to identify and assess the various pressures that can affect program scope, schedule and budget. When evaluating project management, it's important to understand that these challenges can come from both internal and external sources.

State-of-the-art risk management practices are used to identify, assess and manage these issues. The Authority also understands that stakeholder engagement is a major element to ensuring program success. It is important that community issues are addressed, program goals and achievements are clearly communicated and challenges are outlined. This can help to address challenges and maintain program momentum.

The Authority Board of Directors' Finance and Audit Committee evaluates current program status on a monthly basis in a public forum. The competing demands between scope, schedule and budget are discussed and possible mitigation measures are considered. The issues identified below are not unique to high-speed rail and can be found when delivering any large capital infrastructure program. However, we view this Report as an important opportunity to make sure that all interested parties, stakeholders, and the public can have a clear view of the challenges that we are working on every day to overcome in delivering the nation's first high-speed rail system. Risk is inherent to any big endeavor, and so it is important that project partners can understand the risks involved, as well as the tools we are using to manage those risks.

SB 1029 PROJECT UPDATE REPORT

Section (g)

Any issues identified during the prior two–year period and actions taken to address those issues.

MANAGING SCOPE, SCHEDULE AND BUDGET

Like other major infrastructure projects, risks are identified, managed and mitigated on an ongoing basis. There are a number of countervailing pressures that can affect scope, schedule and budget – driving costs upward or downward – creating challenges to meeting environmental and construction schedules and, conversely, opportunities to expedite them.

A discussion of the risks that the program faces and how they are managed is provided in the Executive Summary and Risk Management sections of this report. For example, in the Executive Summary and Schedule sections of this Report it has been noted that the environmental schedules are being updated. These schedules are still undergoing development with the Federal Railroad Administration. Two key risk areas that we continue to manage – right-of-way acquisition and third-party agreements – are discussed below.

RIGHT OF WAY

Advancing construction on the first design-build construction package has been challenging. Specifically, as construction got underway, acquiring the necessary right of way lagged, in part due to legal challenges. The Authority acted quickly to analyze and address this challenge. Based on this experience, we reorganized and enhanced our land acquisition processes, expanded our resources and instituted aggressive management and mitigation strategies with a focus on delivery of parcels. As a result, over 75 percent of the required right of way has been delivered to the Construction Package 1 design-builder, allowing construction to begin in multiple locations in the Central Valley, with many more expected in 2017.

Before construction can begin the Authority must obtain legal possession of a property. There are many steps required to identify and then complete the acquisition process. Acquisition is affected by the completion of environmental milestones, receipt of funding, completion of design, followed by multiple levels of governmental review and approval processes and the cooperation of property owners. Acquisition has also been affected by alternative technical concepts proposed by the design-build construction teams. These design changes require new right of way to be surveyed, appraised and acquired. Delays in the acquisition process are affecting the contractor's ability to meet project deadlines. Some delays are the result of the contractor, some have been Authority-driven, and some are external factors within the process outside of anyone's control.

It is important to note that the magnitude of parcel acquisition is very large for this project. Over 1,600 parcels will be acquired for construction in the Central Valley. As of mid-February, the Authority has acquired 1,051 parcels, a significant milestone in the right-of-way acquisition process. For more detail on this topic, see this report's Risk Management section.

Actions Taken: The Authority is mitigating and managing the risk associated with right of way in a variety of ways, including development of a highly detailed acquisition plan, vetting the acquisition plan with contractors and prioritizing acquisition to meet initial contractor work-zone requirements and securing technical expertise and additional capacity. The Authority is also working to streamline administration of the right-of-way process in order to mitigate for schedule challenges that gave a late start to property acquisition. In anticipation of the Silicon Valley to Central Valley Line, the Authority is proceeding to procure additional right-of-way support services to survey and map parcels that may be needed for that line in order to be positioned to begin securing those parcels once environmental clearance is complete.

THIRD-PARTY AGREEMENTS

The Authority is in the process of negotiating numerous agreements to facilitate design, cost apportionment and relocations of utilities, facilities and railroads that are affected by the design and construction of the high-speed rail project. Due to the complexity of the program, and the necessity of developing new relationships with these entities which will extend from construction through operations, some of these agreements have taken longer to finalize than anticipated. Some of the stakeholder concerns that the Authority works to address include: compliance with federal requirements such as Buy America;

Managing the design-build construction packages in the Central Valley

Over the last two years, we have encountered and managed a number of risk pressures during construction:

- **Right-of-way acquisition:** This project requires the acquisition of an unprecedented number of parcels of land. Due to circumstances related to federal funding through the American Recovery and Reinvestment Act, the first design-build construction package (Construction Package 1) was awarded with virtually no right of way in place. The right-of-way acquisition process was also slow to start due to litigation-related delays. This resulted in a need to act quickly to reorganize and refine the land acquisition process and implement improvements to its management strategies. As a result, right-of-way acquisition has become an even higher priority focus for the Authority, requiring ongoing, active coordination with other agencies involved in the process. It has resulted in now having about two thirds of the 1,695 parcels needed for construction in the Central Valley and has enabled construction to begin at more than a dozen sites.
- **Finalizing third-party agreements:** Due to the complexity of the project and the necessity of developing new relationships and agreements with a large number of entities including utilities, railroads and water districts – completing these agreements has taken longer to finalize than projected. Mitigation strategies were implemented so that key agreements with these companies and agencies were completed in order to begin construction. We are now able to build on the relationships established and the experience garnered through those initial agreements. We are now also initiating outreach to third parties earlier in the process.
- **Spending federal American Recovery and Reinvestment Act (ARRA) funds:** The deadline to spend ARRA funds is September 2017, and spending must take place by the end of June 2017 in order to meet that statutory requirement. With construction slow to start, there was a risk of not expending the $2.55 billion in federal ARRA funds before the deadline. Failure to do so risked losing a portion of those funds for the program. To address this risk, we worked closely with all three design-build contractors to identify and prioritize activities and manage roadblocks so that work could be advanced and funds could be expended more quickly. In addition, we worked with the Federal Railroad Administration to establish a working capital fund for right of way which enabled acceleration of right of way acquisition. As of February 21, 2017, $2.29 billion of the $2.55 billion had been invoiced and submitted for reimbursement to FRA.

The above challenges are indicative of the types of risk pressures we face in delivering the high-speed rail program. The actions taken demonstrate how the risk management process is used to identify risks early and put corrective actions in place to effectively manage and mitigate them. This process continues as work proceeds on construction in the Central Valley, and we will continue to face and manage a range of scope, schedule and cost pressures.

An important part of delivering a complex infrastructure project is building upon, incorporating and applying lessons learned. We are doing this not only as we continue to manage Central Valley construction, but also as we plan and prepare for future construction to complete the Silicon Valley to Central Valley Line.

possible impacts of the high-speed rail project on future growth; maintenance of facilities or services provided by these entities; designing relocations to be compatible with the safety standards of high-speed rail; and, ensuring continuation of service during construction. Third parties are also concerned with setting precedents with a new state agency and project funding, and can therefore be very cautious in negotiating agreements. Failure to execute these agreements in a timely fashion can impact project schedules.

Actions Taken: The Authority is addressing these concerns on a number of fronts, including working closely with the affected utility companies in managing utility design and construction requirements, and in finalizing all cooperative utility agreements. The Authority is entering into both general and location specific agreements with utilities to establish an early understanding with the utilities on scope, schedule and financial relocation details. The agreements also provide additional information to the design-build contractors on potential unknown variables such as durations of design, review and construction and expectations for specifications, processes and any potential disputes. In addition, the Authority is collaborating with the utilities and the FRA to identify any potential Buy America issues.

The Authority is moving forward with the railroads on design work and coordination to address concerns about future growth and safety measures and has negotiated an agreement with the BNSF and Union Pacific Railroad to include intrusion barriers where appropriate.

Issues related to the electrification of the train are being handled through the rulemaking process with the California Public Utilities Commission (CPUC). The Authority has reached a tentative agreement on a new General Order, subject to the completion of the CPUC approval process.

FUNDING

Since the inception of planning for high-speed rail in California, it has been assumed that the program would be funded with federal funds, state funds and private sector investment, each at approximately one-third. This was the underlying assumption when the California Legislature and the voters approved Proposition 1A in 2008, which included the following language directing that the Authority "…pursue and obtain other private and public funds, including but not limited to, federal funds, funds from revenue bonds, and local funds…" to augment the high-speed rail bond funds.

The challenges of funding a transportation system or network are not new to this program or most other large-scale programs. The Authority is funding and implementing it in the same way that high-speed rail systems are developed throughout the world in a series of overlapping phases each supported by available funding.

More specifically, the Authority has developed a sequenced approach to the Phase 1 system that is designed to maximize current federal and state dollars to deliver the earliest operating high-speed rail line within anticipated funding levels and to comply with Proposition 1A requirements. Once the system is operational and begins generating revenue, private sector entities will bid for the right to operate the system and receive those revenues, with the resulting investment being used to continue building out the system.

To date, the Authority has secured three funding sources to design, develop and construct the system.

- **Federal Grants –** The Passenger Rail Investment and Improvement Act of 2008 (PRIIA) established the framework for the national high-speed rail and intercity passenger rail programs. In 2009, President Obama signed the American Recovery and Reinvestment Act (ARRA). Using PRIIA as a framework, Congress appropriated through ARRA an investment of $8 billion for new high-speed and intercity passenger rail grants. The Authority has received $3.48 billion in federal grants to date, an award under ARRA and under the High-Speed Intercity Passenger Rail Program for Federal Fiscal Year 2010.

- **State Proposition 1A Bond Proceeds –** In 2008, California voters approved the Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century (Proposition 1A) authorizing the state to issue $9.95 billion of general obligation bonds. Of this, $9 billion in bond funds are available to pay for planning and constructing the system and the remaining $950 million is allocated to capital improvements for commuter and intercity rail lines which will connect to the system.

- **State Cap and Trade Proceeds –** The Budget Act of 2014 (SB 852) included a $250 million appropriation of proceeds from the Cap and Trade Program. Also in 2014, the Governor signed SB 862 establishing a programmatic structure which included a continuous appropriation of annual Cap and Trade proceeds from the Greenhouse Gas Reduction Fund, including 25 percent of all proceeds for the high-speed rail program. SB 862 also appropriated $400 million to the Authority to be made available when needed and continuously appropriated until expended. In making the continuous appropriation the California Legislature determined that these funds could be used to pay for planning and construction costs and/or to repay loans made to the Authority. On September 8, 2016, Governor Brown signed Senate Bill 32 which required the state to cut emissions at least 40 percent below 1990 levels by 2030 and has proposed legislation to extend the Cap and Trade program. To date, $1.2 billion in Cap and Trade proceeds has been appropriated for the project.

The 2016 Business Plan lays out a funding strategy for the Silicon Valley to Central Valley Line that is based on these three funding sources and assumes financing a portion of the capital costs of that line with Cap and Trade proceeds through the year 2050[6]. This line has been deemed to be the most logical approach for how and where to start sequencing the system – building off construction already underway in the Central Valley and based on current circumstances. This line can be delivered with currently available funds, is compliant with Proposition 1A, can generate operating revenue sooner and, with the sale of an operating concession, will accelerate access to private capital to fund additional construction of Phase 1.

Identifying and securing additional funds necessary to complete construction of the entire Phase 1 system is an ongoing process and will require the engagement of the California Legislature, U.S. Congress, the federal government, the private sector and others.

There are two key sources of funding to help complete the full Phase 1 system: (1) the positive cash flow generated from selling tickets (fare revenues), ancillary revenues and value capture which can be

leveraged for financing and private investment; and (2) additional public funds, including federal funds, which can help match project-generated funding. Although not a source of funding, the Authority continues to work to identify ways to reduce costs and deliver the program more effectively through alternative delivery models such as public-private partnerships. This comprehensive strategy is consistent with general practice for large infrastructure projects and provides a reasonable approach for funding the program.

A fundamental goal of the program, which informs many of the Authority's decisions, is to create a commercially successful transportation system to connect the state. As segments of the program are delivered and opened for revenue service, they are projected to generate significant positive cash flow which will support private investment. As discussed above, over time, the value of the system as a commercial enterprise will be significant for the State of California.

The 2016 Business Plan presents an analysis of the potential range of future revenues that could be generated, starting with the Silicon Valley to Central Valley Line. These revenues are projected to have material value to a potential private sector investor which could be captured (monetized) by financing and private sector investment secured by the system's future net operating cash flows. For example, approximately $3.1 billion could be available in 2028 after ridership and net operating cash flow have been demonstrated. If the line were extended from San Francisco (4th & King Street) to Bakersfield, an additional $4.4 billion could be available in 2027, for a total of $7.5 billion. The total value from the initial monetization of the Silicon Valley to Central Valley Line through the completion of Phase 1 to Anaheim (using an 11 percent discount rate) is estimated at $21 billion. For more information regarding this analysis, see the 2016 Business Plan, Section 6: Funding and Financing: ***www.hsr.ca.gov/docs/about/business_plans/2016_BusinessPlan.pdf***

Actions Taken: Identifying and securing additional funds necessary to complete construction of the entire system will be an ongoing process and will require the engagement of the California Legislature, U.S. Congress, the federal government, the private sector and others.

CEQA LEGAL CHALLENGES ON-GOING

COUNTY OF KINGS V. CALIFORNIA HIGH-SPEED RAIL AUTHORITY

Sacramento Superior Court, Filed June 5, 2014

FIRST FREE BAPTIST CHURCH OF BAKERSFIELD V. CALIFORNIA HIGH-SPEED RAIL AUTHORITY

Sacramento Superior Court, Filed June 6, 2014

DIGNITY HEALTH V. CALIFORNIA HIGH-SPEED RAIL AUTHORITY

Sacramento Superior Court, Filed June 6, 2014

CITY OF SHAFTER V. CALIFORNIA HIGH-SPEED RAIL AUTHORITY

Sacramento Superior Court, Filed June 6, 2014

On May 7, 2014, the Board certified that the Final EIR/EIS for the Fresno to Bakersfield project section had been completed in compliance with CEQA. The above listed parties thereafter filed lawsuits under CEQA alleging that, among other claims, that the Authority certified a legally inadequate EIR, failed to

recirculate the revised draft EIR properly, and made inadequate CEQA findings. A few of the lawsuits have minor non-CEQA claims.

Actions Taken: Most of the administrative record has been completed and lodged with the Court. The Authority filed a motion to stay the proceeding on February 19, 2015. After the hearing on March 27, 2015, the Court granted the Authority's motion for stay, pending the outcome of the California Supreme Court Friends of Eel River v. North Coast Railroad Authority case, which is currently under review. In Eel River the Court will decide whether CEQA is preempted for a publically owned railroad that is under the jurisdiction of the Surface Transportation Board. Eel River will have implications in the CEQA cases filed against the Authority.

KINGS COUNTY; KINGS COUNTY FARM BUREAU; CALIFORNIA CITIZENS FOR HIGH-SPEED RAIL ACCOUNTABILITY; COMMUNITY COALITION ON HIGH-SPEED RAIL; CALIFORNIA RAIL FOUNDATION; TRANSDEF V. SURFACE TRANSPORTATION BOARD (STB); CHSRA INTERVENOR

Federal District Court of Appeals, Filed February 2015

In October 2014, the Authority petitioned with the Surface Transportation Board (STB) for a declaratory order that a Court remedy stopping the construction in the Fresno to Bakersfield (F-B) section is not available under CEQA. The five CEQA lawsuits challenging the F-B Section EIR pray for injunctive relief which, if granted, could stop construction. Since STB took jurisdiction over the construction and operation of the California high-speed rail system in June 2013 the federal ICC Termination Act preempts CEQA meaning third parties cannot challenge the Authority's compliance with CEQA.

STB found CEQA is categorically preempted for the F-B section and therefore the Authority cannot be sued for not complying with CEQA. STB also found the Authority's voluntary compliance with CEQA during the environmental review is not controlling because the Authority consistently stated it reserves its right to assert federal preemption.

Plaintiffs have challenged the STB's declaratory order claiming that the Authority must comply with CEQA and that third parties can file a lawsuit to challenge the compliance.

Actions Taken: The Federal Court of Appeals, 9th Circuit is deciding the case. All briefs have been submitted.

OTHER LEGAL CHALLENGES ONGOING

JOHN TOS, TOWN OF ATHERTON, COUNTY OF KINGS, MORRIS BROWN, PATRICIA LOUISE HOGAN-GIORNI, ANTHONY WYNNE, COMMUNITY COALITION ON HIGH-SPEED RAIL, TRANSPORTATION SOLUTIONS DEFENSE AND EDUCATION FUND, CALIFORNIA RAIL FOUNDATION V. CALIFORNIA HIGH-SPEED RAIL AUTHORITY

Sacramento Superior Court, Filed December, 13, 2016

The lawsuit is related to two Proposition 1A bond funding plan actions approved by the Board of Directors for the San Francisco to San Jose Corridor electrification project and the Central Valley construction segment. These funding plans will allow Proposition 1A bonds to be sold after Department of Finance

review and approval. The lawsuit alleges that the Legislature violated the California Constitution when it passed AB 1889 (2016) because AB 1889 materially modified Proposition 1A without voter approval. AB 1889 legislation states that a corridor or usable segment is, "suitable and ready for high-speed trains to operate immediately of after additional planned investments are made on the usable segment and passenger train service providers will benefit from the project in the near-term." Plaintiffs want the court to declare AB 1889 unconstitutional and therefore the two Funding Plans adopted by the Board of Directors in December 2016 which relies upon AB 1889. Plaintiffs also allege the two funding plans that were approved by the Authority, and the associated independent consultant reports, fail to meet a number of the requirements of Proposition 1A.

Actions Taken: This matter will be handled by the Attorney General's office. The Authority was served on February 13, 2017 and a responsive pleading is due in March of 2017. The Authority is currently reviewing the lawsuit and intends to vigorously defend this matter.

8. Risk Management

Identifying and managing project risk is an essential tool to successfully deliver the high-speed rail program. Most of the risks identified in this section – right of way, third-party agreements, and technical – are not unique to high-speed rail, and are inherent to delivering any large infrastructure program.

The Authority is utilizing a state-of-the-art approach to risk management, including an extensively detailed calculation of variables to quantify risk, and the incorporation of lessons learned by global experts from other high-speed rail programs. To that end, the Authority has developed and integrated a quality management system, designed to manage and mitigate quality-related risks, and to ensure the high-speed rail program meets or exceeds acceptable industry and government standards.

The Authority is additionally working with the California Legislature's Peer Review Group (PRG), not just to implement provisions of Senate Bill 1029 (Budget Act of 2012), but to also gain the benefit of the group's perspective and guidance to continually improve the program.

The risk management program provides the Authority with a formal, systematic approach to identifying, assessing, evaluating, documenting and managing risks that could jeopardize the success of the program. These include specific engineering, environmental, planning, right of way, procurement, construction, organizational, stakeholder, budget and schedule risks.

SB 1029 PROJECT UPDATE REPORT

Section(h)

A thorough discussion of risks to the project and steps taken to mitigate those risks.

OVERVIEW OF KEY RISK AREAS

Environmental Approvals

The risk associated with environmental clearances and approvals may be broadly separated into two categories: (1) the risk of obtaining clearances and approvals in the required time necessary to avoid delays to construction; and (2) the risk associated with conditions of the approval (e.g. work windows). While the staff working relationships with Federal Railroad Administration and the various resource agencies (including the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, State Water Resources Control Board, and the California Department of Fish and Wildlife, among others) are constructive, delays occur partially and perhaps largely because of review periods that are extending longer than anticipated.

Schedule impacts can be driven by the complexity of assessments, for example, the consideration of an alignment through the San Luis Reservoir between San Jose and Merced and discussions with the Bureau of Reclamation or with the US Forest Service on proposed tunnel alignments through the Angeles Nation Forest. Because of the interdependencies among various approvals/permits granted by different agencies, it could take delays to only one or two documents/permits at one or two agencies to delay the entire environmental approval process.

The conditions and restrictions associated with these clearances, permits or approvals are another area of uncertainty. For example, the likelihood of encountering important archaeological sites in certain geographic areas is high, but the actual sites in which these are found are generally not known until they are uncovered during construction. The environmental clearance stipulates the process to follow if this happens.

In addition, property acquisition and the ability to exercise permits to gain access to property (permission to enter) for pre-construction requirements also introduces uncertainties that have caused delays in construction. This includes identifying an endangered species whose habitat had expanded beyond previously known boundaries, as has happened with the Buena Vista Lake Ornate Shrew (Sorex ornatus relictus). In order for construction to continue, special species surveys, manual vegetation removal, and exclusionary fencing or other protective provisions are required.

Completion of Phase 1 project sections clearances, which includes both rural and the urban areas in Northern and Southern California, is presenting opportunities to evaluate streamlining of existing environmental processes. This includes the permitting process, which is being accelerated for issuance soon after the Federal Railroad Administration issues the Record of Decision (RODs) and the Board of Directors issues a Notices of Determinations (NODs). Per terms of the contract with design-build contractors, meeting mitigation and permitting conditions is the responsibility of the design-build contractor. However, the conditions are not always fully known until the RODs/NODs are issued and the permits are in hand and the property(ies) in question are acquired.

MANAGEMENT AND MITIGATIONS

We continue to manage these risks by increasing program staff that have specialized environmental expertise and by increasing staff at cooperating federal and state agencies. We are also continually evaluating ways to expedite processes and develop new approaches to strengthen intergovernmental collaboration. In one computerized database the Authority tracks and reports compliance with mitigation and permitting obligations. The Authority has transferred the risk as appropriate to the design-build contractor as explained above.

The Authority specifically:

- → Implemented a number of federal and state environmental clearance strategies to achieve NOD/ROD timelines.
- → Coordinated with the United States Department of Transportation to recommend that all Phase 1 project sections be placed on the Federal Permitting Dashboard, which will assign accountability and coordination with federal permitting agencies, the FRA, and the Authority.
- → Obtained written commitments for set review periods through Authority funding agreements.
- → Obtained process concurrences from lead and permitting agencies for many of our necessary permits and approvals.
- → Established Memorandum of Understanding/Memorandum of Agreement (MOUs/MOAs) with the required agencies.

- Work with the FRA to prioritize resources and reviews.
- Implemented project permitting strategies on parallel tracks with environmental clearances.
- Develop and fund Permission to Enter (PTE) agreements with public entities and private land owners to facilitate access to properties.
- Establish close working relationships with state and federal agencies to expedite permits whenever feasible and continue to keep agencies informed of the schedule requirements and how they affect the schedule.
- Provides funding for additional staff resources for the federal and state regulatory agencies whose staff we rely on for project consultation, reviews and permitting.
- Pursues early access to parcels and funding of environmental survey work whenever feasible.
- Develops and implements an outreach and communication plan through the Regional Managers for coordination with property owners to minimize adverse project impacts.
- Identifies strategies and backup plans anticipating delayed decisions and reviews.
- Coordinates with state and federal resource and regulatory agencies to develop integrated regional planning solutions to develop and optimize landscape level conservation solutions. This advanced planning and land acquisition for conservation, mitigation and permitting will allow sustained project construction.
- Maintains construction schedules, by strengthening Central Valley-based environmental resources, to allow efficient consideration and development of environmental re-examinations on design-build contractors' alternative technical concepts and Authority directed project changes.

Financing and Funding

A number of risks exist related to funding and financing. Funding risks include failure to receive the anticipated amount of public funding at the requisite time, and the inability to manage the timing of committed funds against the cash flow requirements of the program. Both of these funding risks could delay the development of the program. Financing risks include failure to attract lenders and/or investors, as well as potential increases in interest rates. Both of these financing risks could increase the cost of borrowing and investment, delaying construction until borrowing can be put in place, or threaten the ability to finance. While the Central Valley civil infrastructure is fully funded, there remains funding risks related to meeting the administrative requirements for full and timely receipt of the state and federal funding already identified for the Central Valley project.

MANAGEMENT AND MITIGATIONS

The near-term funding risk is mitigated by the identification of all necessary sources of funding at various stages of program development. Long-term funding risk has been reduced by the Authority securing a long-term, continuous funding stream of auction proceeds from the Greenhouse Gas Reduction Fund (GGRF) program. The Authority receives 25 percent of GGRF proceeds, appropriated on a continuous basis. This provides the Authority with a continuous funding source with which it can

advance future sections of the program. The 2016 Business Plan assumes that the 25 percent will on average equate to approximately $500 million each year.

In order to mitigate future funding and financing risks, we continue to:

- Utilize phased implementation to align construction costs with funding.
- Implement innovative delivery models that appropriately transfer risk, reduce costs and accelerate schedule.
- Work with the private sector to position the program for private sector participation.
- Work with private sector lenders and investors to define requirements for financing secured by Cap and Trade.
- Utilize American Recovery and Reinvestment Act (ARRA) reserves to preserve funding for the minimum systems and track connections.
- Work with legislators, the USDOT, the private sector, and other stakeholders to maintain support for funding the programs, such as the High-Speed Intercity Passenger Rail Program; the Passenger Rail Investment and Improvement Act of 2008; the FTA New Starts Program; the Transportation Investment Generating Economic Recovery Discretionary Grant program; the Passenger Rail Investment and Improvement Act reauthorization, etc., and investigate other available funding sources.
- Engage the private sector to discuss timing and requirements for private investment and delivery strategies to reduce costs and attract investment.
- Monitor Greenhouse Gas Reduction Fund proceeds to understand the level of future funding that the program may generate.
- Work closely with the FRA regarding ARRA grant funding requirements.
- Analyze the Authority's ability to utilize innovative federal financing tools, such as Railroad Rehabilitation and Improvement Financing (RRIF) program.
- Perform scenario and sensitivity analysis to test the project's financial performance under different ranges of inputs (see Ridership).

Legal

In the normal course of business associated with implementing a complex transportation infrastructure project, public agencies typically address a range of litigation challenges and adjudicatory administrative processes related to project funding, environmental clearances, property acquisition and contract disputes. These litigation challenges have the potential to affect project schedules, costs, and financing.

MANAGEMENT AND MITIGATIONS

The Authority works closely with affected stakeholders to address issues before they become formal lawsuits or, for lawsuits, the Authority typically seeks to resolve them directly with the stakeholders through settlement discussions. In addition to court resolution processes, the Authority seeks to use alternative dispute resolution such as mediation or arbitration. For litigation purposes, the Authority is represented by the California Attorney General's office except in cases where additional expertise may be required.

Operations and Maintenance Costs

Operations and maintenance (O&M) costs are a key component in the viability of the high-speed rail system. Proposition 1A requires that operating revenue must be sufficient to cover the operations and maintenance costs of the system. As a result, if current operations and maintenance (O&M) cost forecasts differ from actual costs, the Authority risks violating the Proposition 1A no subsidy requirement. Without a directly comparable system operating in the U.S., it is challenging to accurately forecast future system O&M costs.

MANAGEMENT AND MITIGATIONS

The Authority undertook a comprehensive effort to develop a bottom-up O&M cost model for the 2014 Business Plan. The 2014 Business Plan O&M cost model was developed with the U.S. Department of Transportation Inspector General's High-Speed Intercity Passenger Rail Best Practices: Operating Costs Estimation serving as a guiding document and included a detailed estimate of each cost category based on the current information about the system, service plans, federal regulations, and industry standards that is available.

A thorough assessment was undertaken to develop risk-based contingencies on a number of applicable reference projects (for a particular O&M cost category), guidance contingency percentages defining limits, and a group of experts' judgment regarding the uncertainty or risk surrounding a particular O&M category's cost. These assessments were then averaged and combined with the guidance contingency percentages to determine a recommended contingency percentage for the particular O&M cost element. Several external experts reviewed the O&M cost model, including the Peer Review Group, Government Accountability Office, Legislative Analyst Office of California, and the International Union of Railways. All of the reviews found the model adequate for the purposes for which it was being used, and reviewer feedback was incorporated into the cost model. Additionally, the Authority conducted a significant effort to understand the risks associated with the O&M forecasts more thoroughly as part of the 2014 Business Plan. To do that, the Authority conducted Monte Carlo simulations that analyzed the risk to the total cost estimate based on the accuracy of other O&M forecasts (reference cases) and to specific cost categories based on uncertainties internal to those categories (bottom-up). These two simulations showed that current contingency percentages covered the majority of the scenarios in the reference case and nearly all scenarios in the bottom-up case.

In the 2016 Business Plan, the Authority used the same O&M cost model and the top-down risk analysis approach for forecasts, but took additional steps to mitigate forecast risks. Since the 2014 Business Plan, Network Rail Consulting, the operator and maintainer of both the high-speed and conventional rail network infrastructure in the United Kingdom, joined the program and conducted a technical review of the model to ensure international best practices were maintained in the model forecasts, assumptions and approach. The Network Rail recommendations were incorporated in the O&M cost model used for the 2016 Business Plan. For more information on the specific updates to the 2016 Business Plan O&M cost model, please refer to the Operations & Maintenance Cost Model Documentation. ***www.hsr.ca.gov/docs/about/business_plans/2016_Business_Plan_Operations_and_Maintenance_Cost_Model.pdf***

Finally, the Authority is bringing in an Early Train Operator to advise on preparations for operations and maintenance along with other essential commercial aspects of the future system. One of the many important tasks an early operator will provide will be to help the Authority forecast, manage and mitigate future operations and maintenance cost risks. The program will benefit from the industry expertise an early operator will bring the program, including further refinement of operations and maintenance forecasts as well as employing best practices to manage the forecast risks.

Railroad Agreements

Given the proximity between the Authority's alignment in the Central Valley and the existing freight railroad right of way, there is a need to negotiate several agreements with the railroad companies.

To date, the Authority has finalized and signed a series of important agreements within the Merced to Bakersfield Corridor with the Union Pacific Railroad. Specifically, the Authority and the Union Pacific Railroad have executed an Engineering, Construction and Maintenance (ECM) Agreement, an Insurance and Indemnification (I&I) Agreement, and an Environmental Liability Agreement. In addition, the Authority and Union Pacific Railroad have reached agreement and signed several Grade Separation and Right-of-Entry agreements. Finally, the Authority and Union Pacific Railroad finalized and signed two required Easement Acquisition Agreements for Union Pacific Railroad properties in the Central Valley that will be impacted.

The Authority and BNSF have executed a Confidentially Agreement, a Memorandum of Understanding, a Reimbursement Agreement, a Master Agreement and a Joint Corridor Agreement for the Central Valley. A CP 1 Relocation and Construction Agreements, Purchase and Sale Agreement, and Overpass Agreement have been executed and are being used as a template for similar agreements for CP 2-3 and CP 4 that will also be executed in the near term when project designs are at a higher level for BNSF to understand and plan for its facility relocations, including tracks as part of the scope of these CP contracts. All of these agreements inform the design and construction of modifications to BNSF facilities and right of way and operational requirements.

The Authority has also negotiated with two short-line railroads including the San Joaquin Valley Railroad (SJVRR) and West Isle Line (WIL) to finalize and execute various agreements. To date, all needed agreements have been completed with SJVRR and terms have been finalized with WIL to provide a reimbursement agreement for design review.

There is continued risk related to fulfilling the obligations of the agreements once they are in place. The Union Pacific Railroad is currently constructing mitigation projects to their facilities that have the potential to increase cost if conditions differ from assumptions made during preliminary stages of the project. Also, in several instances the scope of the final agreements differs from the draft agreements, which the design-build contractors used for their lump sum bids. In those cases, the Authority compensates the design-build contractors for the extra work through change orders, increasing the contract cost. An example of change orders required by the railroad companies is for the design and construction of additional intrusion protection barriers to eliminate the risk of a freight rail road derailing and intruding onto the high-speed rail right-of-way. In addition, there may be additional costs to the program associated with any unanticipated disruptions to service experienced by BNSF and Union Pacific Railroad during construction. If the remaining agreements cannot be executed with the railroad companies in a timely manner, then design work in progress, or already completed, may be affected, leading to cost increases or schedule delays that could become significant depending upon the length of the delay.

MANAGEMENT AND MITIGATIONS

While the Authority is responsible for securing the agreements with the railroad companies, the Authority has transferred much of the risk related to performance under the agreements to the design-build contractors. The design-build contract mandates that the contractor will be responsible for fulfilling the Authority's obligations under the agreements that were provided to the contractor to base its bid upon.

The Authority has executed reimbursement agreements with the following railroads and operating agencies: Orange County Transportation Authority, Southern California Regional Rail Authority, Capitol Corridor Joint Power Authority, San Joaquin Regional Rail Commission, SJVRR, BNSF and Union Pacific Railroad. In addition, the Authority has executed Memoranda of Understanding with both BNSF and Union Pacific Railroad. To date, the Authority has executed an Engineering, Construction and Maintenance Agreement and a variance to the agreement with the Union Pacific Railroad, which provides for all agreed upon mitigations. The Authority has also negotiated and executed Easement Acquisition Agreements with Union Pacific Railroad for the purchase of parcels required for CP 1. Union Pacific Railroad has begun construction on several mitigation projects and are working to complete these projects in accordance with the agreed upon terms.

At this point, agreement has been reached between the Authority and BNSF in the negotiating of templates for the overpass agreements, the insurance and indemnification requirements, construction and maintenance questions, and property acquisitions which have been executed for CP 1. To expedite the execution of these agreements, BNSF has agreed to the terms of a master agreement. These agreements collectively establish the roles and responsibilities for the parties and will reduce future delays throughout the Central Valley. The Authority and BNSF have recently worked cooperatively to identify engineering solutions for mitigating the adjacency issues within Construction Packages 1, 2-3, and 4.

Ridership and Farebox Revenue

Ridership and revenue are key components in the viability of the high-speed rail system. Proposition 1A requires that operating revenue must be sufficient to cover the operations and maintenance costs of the system. Further, expanding the system depends in part on operating revenue to support access to

private capital as the program matures. The Authority uses sophisticated travel demand modeling techniques that adhere to international best practices to forecast ridership and revenue, but the possibility of forecasting errors remains. Given that the program is a greenfield project with no direct U.S. comparison, it is important to mitigate the risk that actual ridership demand and revenue will differ from current forecasts. The impact to the program could be wide ranging and include the following:

- Decreased commercial and financial viability;
- Lower-than-expected operating revenue;
- Inability to meet Proposition 1A requirements;
- Delay to system expansion;
- Loss of stakeholder support.

MANAGEMENT AND MITIGATIONS

The 2016 Business Plan ridership and revenue forecasts have been through several external peer reviews and evaluated through a range of revenue sensitivity scenarios. High, medium, and low revenue estimates illustrate that the project will generate a positive operating cash flow. For additional detail on the ridership and revenue forecasts, see the 2016 Business Plan Ridership and Revenue Technical Supporting Document. ***www.hsr.ca.gov/docs/about/business_plans/2016_Business_Plan_Ridersihp_Revenue_Forecast.pdf***

In addition to the external peer reviews, three key mitigation strategies reduce the risk that actual ridership and revenue will differ from current forecasts:

- An enhanced travel demand model used for the 2016 Business Plan that incorporates the latest available input data and information
- A more comprehensive risk analysis used for the 2016 Business Plan
- The procurement of an Early Train Operator to leverage industry expertise and help manage ridership and revenue risks

The model developed for the 2016 Business Plan was enhanced with the most recently available input data and new variables to better reflect travel behavior and current travel network information. Specifically, the 2016 Business Plan travel demand model fully integrated the 2013-2014 revealed preference/stated preference survey data, improved model parameters such as trip length, group travel, and transit access. All model updates were made in consultation with the Ridership Technical Advisory Panel, a group of international travel demand forecasting experts. As part of the 2016 Business Plan forecasting effort, the Authority also developed a Risk Analysis Model to estimate a ridership and revenue forecast range and an associated probability for each of the Business Plan scenarios. The risk model was used to develop Monte Carlo simulations for each of the Business Plan scenarios and associated forecast year. The risk analysis model included a range of assumptions relating to various risk factors having the greatest combination of uncertainty and impact on the results.

Main risk factors considered in this analysis include:

- High-speed rail mode constant
- Trip frequency constant
- Auto operating costs
- High-speed rail fares
- High-speed rail frequency of service
- Coefficient on transit access/egress time/auto distance variable
- Availability, frequency of service of conventional rail and buses that connect with high-speed rail
- Airfares
- Auto travel time
- Number and distribution of households across the state

The Authority conducted a risk analysis for 2025 (Silicon Valley to Central Valley scenario), 2029 and 2040; a different combination of risk factors were used for each risk analysis year. For example, airfare risks are more relevant during the Phase 1 system in 2029 and 2040, when high-speed rail will connect San Francisco and Anaheim, but was not used in the Silicon Valley to Central Valley 2025 risk analysis. For each risk factor, minimum, most-likely, and maximum values were estimated based on best available research and analysis. These served as inputs to Monte Carlo simulations which allowed the Authority to quantify the full range of potential ridership and revenue outcomes with the probability of each outcome. Based on this distribution of outcomes, low, medium and high projected values for ridership and revenue were also determined. The low projection is more likely than not to be exceeded by actual future ridership. It is just as likely that the actual results will be greater than the medium projection as that the medium projection will exceed actual results. The high projection will have a correspondingly smaller probability that it will be met or exceed by actual results. Together, these values provide a better picture of the range of potential ridership and revenue scenarios than a single point estimate as well as quantify the probability for each potential outcome. Applying Monte Carlo simulations to each 2016 Business Plan scenario, the risk model provided a probability distribution of ridership and revenue outcomes resulting from identified risk factors together with a sensitivity analysis highlighting the main drivers for ridership and revenue.

Finally, the Authority will bring an Early Train Operator on board to advise on preparations for revenue service. Of the many important tasks, a key item will be to develop mitigation strategies based on real operations experience to help make future decisions on how to maximize ridership and revenue. The Authority will benefit from the industry expertise an early operator will bring to the program, including further refinement of ridership and revenue forecasts as well as employing best practices to manage the forecast risks.

Right of Way

Before construction can begin on a given parcel of land, the Authority must obtain legal possession of the parcel. Thus, the possession of property directly impacts the ability of a contractor to commence construction. The process of real property possession under the federal Uniform Relocation and Assistance Act and the State Public Acquisition Law includes the completion of environmental milestones, receipt and access to funding, participation of multiple levels of governmental review and approval processes, and the cooperation of property owners. This process may include condemnation through the courts to obtain legal possession.

The right-of-way appraisal and acquisition process is active across the entire first construction section which has been defined as CP 1A, CP 1B, CP1C, CP 1D, CP 2-3 and CP 4. (Note that a nearly three-mile northern extension was added to the CP 1 design-build contract and is referred to as CP 1D). CP 1A and CP1B started first and the majority of the learning curve and the establishment of the Authority's right -of-way policies and procedures were developed during this effort. While the right-of-way acquisition process on the CP 1A and CP 1B continues to lag behind the estimated baseline acquisition schedule provided in the awarded CP 1 contract, the prioritized delivery of parcels has allowed commencement of significant construction activity in the Central Valley during 2016. In addition, the Authority executed a contract change order in mid 2016 to mitigate contractor delay claims related to right-of-way delivery. Many of the same challenges are continuing in CP 2-3 and CP 4 including design changes that necessitate modifications to the right-of-way acquisitions resulting in extending the overall delivery timeframes needed to commence construction. The parcels needed for construction in the northern six miles of CP 2-3 have been delivered and construction has now commenced in late 2016. The CP 4 design-builder has proposed several design changes that are being finalized before acquisition can commence in those areas. The Authority has successfully partnered with the CP 1 design-builder during 2016 to continuously identify critical parcels that allow the Authority to prioritize delivery and enable earlier construction at those locations. That model may effectively mitigate potential right-of-way delays as acquisition continues on remaining parcels.

The Authority continues to seek opportunities to improve the right-of-way acquisition process in order to meet the re-baselined acquisition schedules for CP 2-3 and CP 4. While different parcels present different challenges in the right of way acquisition schedule, the primary risk drivers are the following:

- Acceptance rate on first written offers;
- Design changes resulting in modified or additional acquisition needs after negotiations have been processed through the Department of General Services and State Public Works Board (SPWB);
- Railroad agreements;
- Necessary environmental clearances for modified project areas resulting from design changes.

Beyond the first construction segment, the Authority is continuing with the completion of environmental clearances for the Silicon Valley to Central Valley Line. The start of design-build procurement, design and construction of civil and systems infrastructure for operations along the Silicon Valley to Central Valley Line is necessary to meet the operations goal of 2025 identified in the 2016 Business Plan. The Authority faces a challenge in acquiring right of way parcels for the remaining Silicon Valley to Central Valley segment in a timely manner to support the 2016 Business Plan schedule milestones.

MANAGEMENT AND MITIGATIONS

The Authority continues to mitigate and manage the risk associated with right of way in a variety of ways, including development of a highly detailed acquisition plan, vetting the acquisition plan with contractors and prioritizing acquisition to meet initial contractor work-zone requirements and securing technical expertise, and additional capacity. Since March 2014, the Authority has worked to establish better communication with impacted property owners. Additional right-of-way consultants have been hired, and assigned a dedicated right of way program manager, who is charged with strategic planning as well as identifying and addressing procedural bottlenecks.

The initial risk-informed contingency assessment for Construction Package 1 factored in the risk of delays in acquiring right of way parcels and included cost of potential delay claims in the Board-approved contingency of $160 million. The Construction Package 1 project contract was awarded in August 2013 with a contract completion date of March 2018. Delays in delivering parcels to the contractor resulted in contract delays of approximately 24 months through December 2015. The Authority resolved all contract delays with the contractor through December 2015 by negotiating a $49.9 million delay claim to extend the completion date from March 2018 to August 2019, without impacting the overall program schedule, and negotiated change order for an additional $13.6 million to recover the remaining 7 months of delay.

To mitigate the risk of right-of-way acquisition delays in the remaining portions of the Silicon Valley to Central Valley Line, the Authority plans to seek Board of Directors approval to start development of appraisal mapping soon after the environmental preferred alternative recommendations but before the Record of Decision. Also, during the environmental evaluation, the right-of-way team will work closely with project engineering and environmental team to clear sufficient corridor width to provide more design flexibility to the design-build contractors in order to reduce additional right of way requirements during future design refinements. Right-of-way task managers are also reviewing preliminary alignments to evaluate acquisition costs and minimize complex parcels that may require longer acquisition timelines. Additional steps include:

- Implementation of project management principles in the delivery of right of way including assignment of task managers for each construction contract that report to the Project Manager.
- Management of critical path schedules for delivery of key parcels.
- Establishment of additional performance measures on the delivery process to increase accountability and enhance performance.

- Partnering with the design-build contractors to identify critical parcels needed for near term planned construction and potentially re-sequence or accelerate portions of the work in the most efficient manner based on parcel availability.
- Consultation with Department of General Services and the State Public Works Board to reduce review processes and enhance delivery.
- Focused training on distinct aspects of the Authority's right of way process (e.g. partial acquisition appraisals, RON/condemnation process) for all right of way consultants and reviewing and approving agencies.
- Coordination with all review agencies with respect to the project status and expected workload.
- Coordination with Caltrans legal team to manage the potential caseload.
- Continue regular meetings with right of way and design-build contractor to identify status of parcel acquisition and provide that priority parcels receive proper attention.
- Hiring additional staff with institutional knowledge of the right-of-way acquisition process as well as utilizing loaned staff from Caltrans.
- Provide clear expectations to the right of way consultants and manage the work effort with the intent to adhere to the timing and quality requirements as outlined.
- Improved data management and weekly reporting capabilities, including numerous reports to provide visibility on the process, progress, performance and status with improved forecasting.
- Identification of bottlenecks in the process for right-of-way management to resolve.

Staffing and Organizational Structure

During peak construction years, the annual construction outlay will exceed a billion dollars annually. The Authority's challenge is to attract and retain the appropriate number of experienced staff and consultants to meet the demands of the program. During the peak years, staff is needed to mitigate and manage multiple construction contracts, contract change orders, configuration management, funding, finance, contract administration, project management and other capital outlay program issues specifically related to the high-speed rail program. Without adequate staffing and expertise to support and make the necessary timely and informed decisions to advance the program, delays and cost increases become a greater risk.

MANAGEMENT AND MITIGATIONS

The Authority has strategically grown its staff and organizational structure to support the delivery of the program and intended project phases. In past years, the Authority has grown incrementally year-over-year to support the organization's initial start-up and planning tasks, then increasing staff to support and manage the start of construction. Later positions were added to provide additional legal, project management and oversight of the project construction packages and assist with planning, develop-

ment and execution of upcoming phases. Most recently, positions were added in the Audit Division to perform contract and performance audits that will assist the Authority in carrying out the project in a sound, economical, and efficient manner. Significant progress has been made in filling positions - as of February 24, 2017, the Authority has 193 of 226 positions filled with the remaining 33 positions estimated to be filled by mid-2017.

Stakeholder Support

The high-speed rail program could experience adverse effects if public support declined at either the local or statewide level. Local or regional stakeholders or community interest groups could attempt to prevent or delay advancement of the system by hampering the environmental process, local authorization and permitting processes, or inhibiting local collaboration. At the state level, a decline in public support could translate into reduced political support for the program or and/or funding support and oversight functions. Maintaining strong public support at all levels through education and outreach, while clearly vital, also poses its own risks to the system if expectations are not prudently managed and mitigated. If the Authority does not clearly articulate both the program's impacts, costs and benefits, support could weaken. As well, if the Authority agrees to mitigations without first determining their cost implications for the overall program, there is a risk that public support will erode and/or the program's overall costs could exceed current estimates.

MANAGEMENT AND MITIGATIONS

Mitigation of this risk is managed at all levels within the organization, both statewide and at the regional level. The Authority maintains and manages a comprehensive public information and involvement program, and uses multiple means to inform the public and stakeholders as well as an internal communications system to share updates with employees and contractors.

At the regional/project section level, outreach activities include open house community meetings, community and technical working groups, as well as community and stakeholder outreach specific to each project section's needs. The Regional Directors and local section outreach teams act as a point of contact for local and regional stakeholders to address community needs and concerns related to potential project effects in their regions. Regular stakeholder and/or public meetings are held to facilitate communication opportunities and relationships between the high-speed rail program and its myriad publics.

At the state level, ongoing communication with legislators and state agencies are ongoing to ensure that current and factual information is shared at multiple levels. Similarly, at the federal level, Authority staff maintain an ongoing line of communication with members of Congress and their staff and with federal agencies.

The Authority maintains a robust and responsive media relations program to provide timely and accurate information. In addition, the Authority uses a wide range of media channels, both digital and traditional, and develops public information materials and content, such as videos, newsletters, fact sheets and simulations, to inform and update the public.

The Authority's Small Business Advocate, and small business outreach team, serve as the main points of contact with small businesses. This coordinated effort conducts outreach sessions to educate small businesses regarding the high-speed rail program and opportunities, partners with other state agencies to provide resources to small businesses, and advocates for California certified small businesses.

Technical

The program will be measured by compliance with Proposition 1A passed by voters in 2008, which outlines the legal, political, financial, and technical requirements for the system. Transportation programs have varying degrees of technical issues throughout each phase of a major capital program that include the environmental phase, preliminary engineering and final design through construction, and startup of revenue operations. Technical issues are usually evaluated in an analytical manner and resolved through established design procedures and standards that meet best practices in the industry.

Since high-speed rail systems do not currently operate in the U.S., the Authority assessed European and Asian high-speed rail systems in order to develop guidance and technical requirements that could be adapted to the U.S. market. With the majority of alignment segments in the program outside the Central Valley still largely in the project level environmental phase, a concerted effort was made to develop criteria and provide technical guidance to support the ongoing work by the regional environmental teams. This criteria informs the team as alignment alternatives are developed and project impacts evaluated and appropriate mitigation measures considered to eliminate or minimize impacts on the environment. These criteria were needed to provide guidance focused on engineering challenges specific to the mountainous terrain north and south of the Central Valley.

MANAGEMENT AND MITIGATIONS

Technical challenges will be identified throughout development of the program and solutions will be developed by engineers and industry experts. Several of the significant engineering challenges and steps being taken to provide solutions are listed below:

- Models were developed that quantify the risks of potential derailment by adjacent freight railroads and allow the risks to be evaluated and ranked as to their significance. Discussions on mitigation measures such as intrusion protection barriers, earth or retained berms, increased track separation and intrusion protection through early detection with advance signal notification to approaching high-speed rail trains have been successfully concluded with the freight railroads. Refinement of model parameters including trainset length, weight and configuration, train speed, coupler rotation, and offset of barrier from track have been completed. And, a final draft intrusion barrier assessment report was prepared to document the adequacy of the intrusion barrier and other mitigation measures including earth or retained berms to mitigate the potential impact of freight or high-speed rail derailments. An agreement is in place with Union Pacific Railroad and final negotiations with BNSF are in progress.

- Earthquake faults throughout Northern and Southern California regions pose challenges particularly for the alignments though the Tehachapi Mountains between Bakersfield and Palmdale, through the San Gabriel Mountains between Palmdale and the San Fernando Valley, and through the Diablo Range near Pacheco Pass, between Gilroy and Los Banos. Mitigations include crossing active faults at-grade where practical or crossing faults in underground struc-

tures with seismic fault chambers or oversized tunnel segments that can accommodate shifts in track alignment, so that tracks and systems can be repaired and revenue service restored if movement occurs along a fault. The Southern California and Northern California segments are continuing with project-level environmental analysis, and supported by seismic and tunnel experts who are conducting analyses to identify location and magnitude of potential impacts in conjunction with completion of project footprints. Technical solutions are being evaluated based on practices that balance cost, reliability and risk to the project.

- Mountainous terrain also poses challenges in establishing vertical alignments that achieve the high-speed operational requirements without requiring the extensive use of capital-intensive underground structures and support facilities. Even with careful preparation of design requirements tailored to the topography, long tunnels and tall aerial viaducts, or high embankments, are still required in certain sections to support the high-speed tracks, and are included in the environmental assessment. In an effort to minimize potentially long haul distances through mountainous terrain, to reach quarry sites and obtain fill material or dispose of tunnel muck, the potential re-use of tunnel muck and identification of additional and more nearby disposal sites is under consideration.

- Hazards analysis in long tunnels is being evaluated by the regional teams and a Steering Committee that is assessing the risk and probability of occurrence of tunnel specific events that includes risks related to construction, operation, fire, seismic, flooding and other catastrophic events. Potential mitigations include high-strength tunnel liners, egress cross passages, mechanical ventilation, and points of safe refuge.

- Groundwater resources in tunnel alignments, notably in Southern California with the deeper tunnels under the Angeles National Forest, are being identified through early geotechnical investigations to establish groundwater regimes and to assist in creating groundwater model to assess impacts and help identify where additional geotechnical investigations are needed to assist final design and construction. Groundwater resources include underground aquifers, wells, springs seeps, and perennial streams. Control of groundwater inflows to the tunnels may require construction techniques such as pre-excavation grouting, special liner gaskets, and secondary tunnel lining systems. Data obtained from the geotechnical investigations will guide designers in preparing tunnel construction plans that are appropriate for the in situ conditions. In addition, the establishment of a groundwater resource monitoring program is required by the U.S. Forest Service to be in place years in advance of actual construction work. Mitigations measures will be implemented during pre-construction and construction phases.

- Phased geotechnical investigation programs have been conducted to support the environmental review process and evaluation of geologic conditions, seismic ground motions, ground water depths, and hydrostatic pressure, are in progress to support environmental analysis. With the 2016 Business Plan commitment to a Silicon Valley to Central Valley Line, an expanded geotechnical investigation program—necessary to establish baseline conditions for the development of final design, construction and to secure permits—will be underway in 2017.

- Earthquake early warning systems are under evaluation for the high-speed rail program and will provide early detection of seismic waves to allow trains to slow and minimize risk of damage. The early warning system will work independently but will be able to integrate with the State's proposed early warning system once implemented.

- Regional ground subsidence in the Central Valley is accelerating due to consolidation settlement of the deep alluvium soils. This occurs in response primarily to excessive groundwater pumping. In prior wet years, the associated decrease in groundwater pumping had resulted in a steady recovery of water levels and a reduced rate of subsidence. This issue is being evaluated along the high-speed rail alignment to understand impacts to system construction and operation.

- Further data and analytical work is being completed by a specialized consultant to evaluate available data in the region relevant to subsidence and potential impacts to construction and operation of high-speed rail facilities as a result of subsidence. Analysis has shown that induced change in vertical slopes, vertical curvature, horizontal displacement and curvature are all within established high-speed rail track tolerances. Differential settlement is a potential concern, but can be mitigated though an operations and maintenance program that is planned for the system. Ultimately, groundwater will be regulated by the 2014 Sustainable Management Act that is being implemented by Department of Water Resources and requires all groundwater extractions to reach a sustainable level by 2040. Impacts on floodplain elevations attributed to ongoing subsidence in the Central Valley are also being evaluated. Changes in floodplains is a concern to high-speed rail operations, but is a regional issue, and is recommended to be addressed on a regional level by appropriate state and federal agencies.

- Further development of design criteria, with lessons learned from Central Valley, is underway to reflect the higher seismic regions in northern and southern California and to recognize the technical challenges that include tunneling, landslide, complex structures, and high embankments. This updated criteria will be included in new procurements. During the updating of the design criteria, the Authority has employed a Technical Advisory Panel to provide expert opinions, review design criteria, and provide constructive feedback. The Authority is also working with the Caltrans Seismic Advisory Panel to provide additional independent input on criteria and has set up a Seismic Specialty Team to develop site specific seismic criteria for final design.

Third-Party Agreements

Prior to selecting a preferred alternative, the program faces information limitations regarding the physical location of many utilities (both major and minor), ownership of utilities. There is generally a limited understanding of the location of the utilities, and therefore how this and other third-party work will best be integrated with construction of high-speed rail infrastructure and systems. With limited information on the location of utilities, it is not possible to provide schedules and cost estimates with a high degree

of confidence. While the Authority is currently in negotiations with the identified utility owners who will be impacted, there are variable levels of utility information available. The Authority, the design-build contractors, and utility owners, may need to include significant risk contingencies/price in risk for the cost of the relocation or removal of the utilities.

MANAGEMENT AND MITIGATIONS

The Authority is working to mitigate and manage the risk associated with utilities in a variety of ways, including working closely with the affected utility companies in managing utility design and construction requirements, and in finalizing all cooperative utility agreements. In June 2013, Governor Brown signed SB 85 (Committee on Budget and Fiscal Review, Chapter 35, Statutes of 2013) that established a framework for the reimbursement or payment, and apportionment, of utility relocation costs, clarifying the Authority's utility relocation process on land acquired for the high-speed rail project. Additionally, the Authority has reached agreement on the General Order, pending adoption by the CPUC that resolves design and coordination with the utilities.

Furthermore, the Authority is entering into both general and location specific agreements with utility companies, to gain an early understanding of the scope, schedule and financial details of the utility relocations. The agreements also provide additional information to the design-build contractors as to potential unknown variables such as durations of design, review and construction and expectations for specifications, processes, and any potential disputes.

Endnotes

1. Streets and Highways Code Section 2704.08(d) requires the preparation and approval of a Funding Plan in order to commit bond fund proceeds for the high-speed rail system. Section 2704(f) requires that a Usable Segment be selected and Section 2704(g) provides the criteria for its selection. Section 2704.08, subdivision (d)(2) requires that an Independent Consultant prepare a report on the Funding Plan. Section 2704.08(d) also lays out the requirements associated with the 60-day review by the Joint Legislative Budget Committee and the review/approval process by the Director of Finance.

2. This aligns with recent federal laws regarding approval of transportation projects (MAP-21 and FAST Act) and with CEQA. It is important to note that the identification of a preferred alternative does not represent a final decision - which will only be made at the conclusion of the process at the issuance of the Record of Decision and the Notice of Determination. An alignment other than that designated as the preferred alternative may still be selected.

3. ***www.pacific.edu/Academics/Schools-and-Colleges/Eberhardt-School-of-Business/Centers-and-Institutes/Center-for-Business-and-Policy-Research/California-and-Metro-Forecast.html***

4. Public Utilities Code Section 185036 allows the Authority to enter into contracts with public entities for the design and construction of its high-speed rail facilities; Caltrans owns and operates this section of SR 99.

5. Caltrain applied for $647 million from the Federal Transit Administration's Core Capacity program. However, the Trump Administration recently deferred a final decision on the grant which is also key to funding this project and federal action is still pending as this report is being released. Governor Edmund G. Brown Jr. has sent a letter to United States Department of Transportation Secretary Elaine Chao urging her to approve the Caltrain grant, and the Authority will continue to work with Caltrain to advance this critical project.

6. The 2016 Business Plan also places high priority on making concurrent investments in the Burbank to Anaheim corridor and funding extensions of the Silicon Valley to Central Valley line to complete links to Bakersfield, Merced and San Francisco.